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The Emergence of DP in the Partitive Structure

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THE EMERGENCE OF DP IN THE PARTITIVE STRUCTURE

A Dissertation Presented

by

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DEDICATION

To Maude for inspiring me to follow my dreams and for putting up with me while I did so.

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ABSTRACT

THE EMERGENCE OF DP IN THE PARTITIVE STRUCTURE

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This dissertation is a first look at English-speaking children's acquisition of the syntax of the partitive. It presents four experiments that contrast three types of structures and examines how they interact with adjectival modification: the partitive, the pseudopartitive and complex nouns with prepositional adjuncts. The experimentation investigates whether children recognize that the Determiner Phrase (DP) in the partitive is a barrier to adjectival modification. The partitive is contrasted with the pseudopartitive –a minimal pair structure that lacks an internal DP. The data shows that children under the age of six do not distinguish between the partitive and the pseudopartitive. They allow adjectives preceding the partitive to modify the second noun; this is standardly considered licit for the pseudopartitive structure, but not the partitive. This result is evidence that children are under-representing the syntax of the partitive and of DP. Syntactic representations of minimal DP and minimal partitive structures are suggested and it is argued that these structures may persist as an option in the adult grammar.

Chapter 2 discusses multiple layers in DP, DP's status as a barrier/phase and how children acquire its syntax (Abney 1987, Cinque 1994, de Villiers & Roeper 1995, Kupisch 2006, Bošković 2008). This chapter also includes evidence for an under-represented DP in the grammar of some adult English speakers (Schafer & de Villiers 2000, Carlson et al 2006). Chapter 3 presents background literature on the syntax of the partitive (Jackendoff 1977, Hoeksema 1996), introduces the pseudopartitive structure (Selkirk 1977, Stickney 2004 and Alexiadou, Haegeman & Stavrou 2007) and presents acquisition hypotheses. Chapters 4 & 5 present a pilot experiment and three picture choice tasks. The experimental data shows that children and a subset of adults do not distinguish between partitive and pseudopartitive and yet they maintain a clear distinction between pseudopartitive and other similar complex nouns. Chapter 6 presents two syntactic analyses of the data. One uses a split-DP structure (Zamparelli 2000, Laenzlinger 2000) to explain the lack of barrier in children's partitives. The other suggests a reduced partitive structure (Rutkowski 2007). Both analyses require a reanalysis of the features of DP in children's partitives.

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CHAPTER 1

INTRODUCTION

This dissertation investigates how English-speaking adults and children comprehend the syntax of the partitive structure. The processing and acquisition of the syntax of the partitive has not previously been investigated in the psycholinguistic literature. I present data that give us information about the complexity and potential ambiguity of the syntax of the noun phrase, the determiner phrase and the partitive in English. In this dissertation I lay out these complexities and ambiguities and discuss what this means for the language acquisition device and the state of the adult grammar.

The partitive (1) is a complex noun phrase. Its first noun designates a measured portion of its complement, a definite[1] noun designating a discourse relevant set.

(1) a bag of the coffee

In this study, I look at children's acquisition of the partitive by contrasting it with the pseudopartitive (2), which differs from the partitive on the surface only by the lack of a determiner. Throughout this dissertation I will refer to "bag" in both constructions as N1 and "coffee" as N2 (despite the fact that I will argue that the pseudopartitive contains only one noun).

[1] The second noun in the partitive is usually definite but can sometimes be indefinite, as in *he took a bite of an apple* (de Hoop 1997).

(2) a bag of coffee

As first noted by Selkirk 1977, the partitive and the pseudopartitive differ with regard to their semantics and their syntactic structure. While the partitive denotes a measured amount of a larger set, the pseudopartitive denotes a single unit or entity (Selkirk 1977). Consider, for instance (3) and (4).

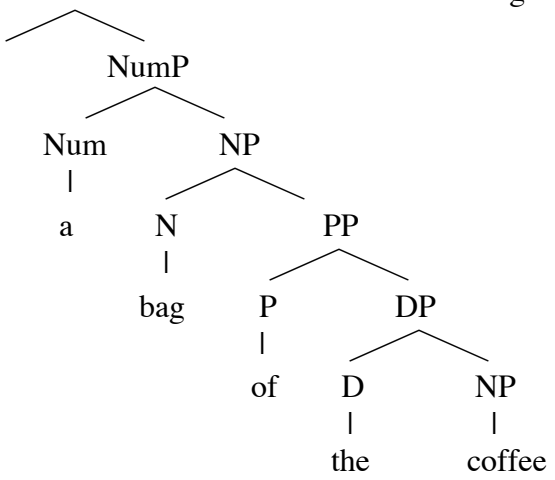
(3) a slice of tomato

(4) a slice of that green tomato from Whole Foods

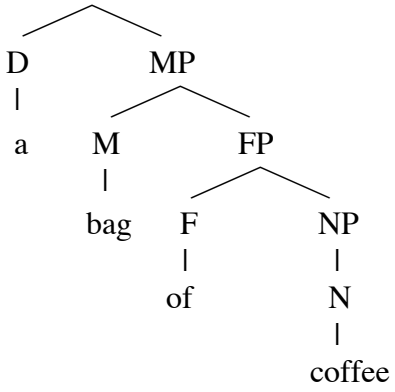
The pseudopartitive (3), on one reading, does not take into account the greater tomato from which the slice was taken. If I ask for a slice of tomato on my sandwich, it does not require reference to any particular tomato or that it came from a larger entity at all. It is just a single entity, a slice of tomato. This contrasts with the partitive (4), which necessarily makes reference to the larger entity from which the slice came.

The partitive and the pseudopartitive also differ greatly in their syntax (5-6), contrasting in English (and many other languages) in the areas of extraposition, recursion, fronting, stranding and interaction with modifiers (Chapter 3).

(5) “a bag of the coffee” [partitive]



(6) “a bag of coffee” [pseudopartitive]



The experimentation herein investigates whether children are able to distinguish between the partitive and the pseudopartitive. Do children recognize that the partitive is bi-phrasal, while the pseudopartitive is a single nominal projection? The ability to distinguish between these two constructions is one sign of mastery of the partitive structure. As a diagnostic for the ability to distinguish between partitive and pseudopartitive, I look at adjectival modification. An adjective preceding the pseudopartitive can modify N1, N2 or both (5).

(5) I ended up with a partially singed bag of coffee.

In (5) the speaker could be referring to a situation in which bag, coffee or both were singed. I take the view that adjectives modify the noun whose noun phrase they are a part of. Because the pseudopartitive is a single nominal projection, the adjective is free to modify past the Measure Phrase to the head, or to modify both (by virtue of the MPs association with the noun).[2] Contrast this with the partitive (6).

(6) a. After the fire, I ended up with a partially singed bag of Joe's coffee, but the beans inside were perfectly fine.

b. After the terrible roasting fiasco, I ended up with a partially singed bag of Joe's coffee. #I wish the bag had burned rather than the beans.

In (6) the adjective cannot modify N2 ("coffee"). In order for the adjective to modify N2 in the partitive it would have had to have originated adjacent to N2 and then moved to its surface position adjacent to N1 (receiving the lower interpretation during LF reconstruction – Chapter 3). This movement is blocked by the partitive Determiner Phrase. Languages that have been argued to lack DP, such as Serbo-Croatian allow movement of adjectives out of the noun phrase. In Serbo-Croatian these adjectives appear on the surface in spec,CP (Bošković 2008).

Because this investigation of the acquisition of the partitive crucially hinges on the recognition of DP as a barrier, the research herein is also tied to the literature on the nature of

[2] An interpretation in which the adjective refers only to N1 is due to an alternate syntactic structure for the pseudopartitive which is discussed in Chapter 6. This structure is an N1-headed pscudopartitive, which looks identical to the partitive structure (5), containing two NPs, but is lacking the DP layer that is associated with N2.

DP and its acquisition in English (Chapter 2). The Determiner Phrase is complex and varies crosslinguistically with regard to what semantic features it encodes. There is much debate among syntacticians regarding how many syntactic nodes make up the overall determiner phrase, whether there are nodes relating to each semantic distinction/feature, whether these nodes are present in all languages and, indeed, whether DP itself is present in all languages (Kayne 1994, Campbell 1996, Giusti 2002, Laenzlinger 2000, Zamparelli 2000, Longobardi 2001, Bošković 2008). Those who study children's acquisition of DP, in addition to the previously mentioned issues, are at odds over whether children initially lack DP or whether it is present at the onset of the acquisition process. Those who believe DP must be acquired are at odds over whether DP emerges as a complete entity or must be learned one feature (and node) at a time (Radford 1990, Coles 1998, de Villiers & Roeper 1995, Chierchia, Guasti & Gualmini 1999, Schafer & de Villiers 2000, Matthewson, Bryant & Roeper 2001, Baauw 2002, Kupisch 2006, Roeper 2006, Wexler in press).

I assume the standard view that languages have the option of having an NP or a DP as the maximal nominal projection (Chierchia 1998). Those languages that possess a DP are varied in what features those DPs contain. Children, once ascertaining that their language in fact *has* a DP, will project the most minimal DP structure until they have semantic evidence that they should project more. This predicts that children who are acquiring the partitive structure may not yet be able to project a barrier feature on DP, even though they are able to project some structure to house the determiner. It follows then that children will treat the partitive as if it were pseudopartitive with respect to adjectival modification.

I discuss four experiments, involving children aged 3-6 and adult controls. In the first experiment, a large pilot study, subjects were engaged in act out tasks and story comprehension tasks that involved adjectives modifying partitives and pseudopartitives. Children aged 3-5 did not distinguish between partitives and pseudopartitives at all. Six year olds made some distinction, but it was not significant. 25% of the time adult subjects did not distinguish between the two either, although adults as a whole distinguished significantly between the two constructions. The second experiment was a replication of the pilot, but with a cleaner experimental design. All items were picture choice and carefully balanced. The children still did not significantly distinguish between partitive and pseudopartitive, but the adult error rate dropped to 14%. This experiment was contrasted with an almost identical experiment, which contrasted the pseudopartitive with prepositional adjunct structures like "a bag with coffee" preceded by an adjective. In these cases all age groups reliably did not allow the adjective to modify N2, showing that children's difficulty with the partitive is not due to a general inability to constrain the adjective. The first and second experiment used partitives that contained the definite determiner "the" (e.g. "a sparkly pot of the beads"). The fourth experiment varied the type of determiner, contrasting "the", demonstratives and possessives. Children's error rates remained roughly the same, while adults averaged a 20% error rate across determiner types in the partitive.

I conclude that when children begin to project the Determiner Phrase, they project a minimal structure that can house the determiner but lacks various semantic and syntactic properties including the barrier feature. Children process determiners on a case by case basis, looking for semantic and pragmatic evidence (such as referentiality or specificity) that trigger the

projection of the full DP (which includes the barrier feature). Eventually, English speaking children get enough evidence of this sort that the full DP becomes the default, although there will still be some pockets of the grammar, such as expletive "the"[3], where the minimal DP will still appear. I suggest that some adults reach adulthood never having solidified the full DP as the default and thus for infrequent constructions will revert to the minimal DP unless they have semantic/pragmatic evidence to trigger the projection of more structure. For these adults, partitives of the type discussed in this dissertation fall into the category of infrequent constructions (Chapter 6).

I claim (following Laenzlinger 2000) that adjectives move overtly within DP to check particular semantic features. When adults and children allow an adjective adjacent to N1 to modify N2, I suggest that they are not fully projecting the DP associated with N2. The adjective is generated in N2, but cannot have its features checked due to an incomplete DP. This triggers movement of the adjective from N2 to N1. This movement is allowed because the barrier feature is missing from the lower DP (Chapter 6).

There are at least two plausible ways to account for long-distance adjectival modification. One is through movement, the other is through simple modification via c-command (in which case the adjective is base-generated adjacent to N1 and would be blocked from modifying by a barrier such as a fully projected DP). Both of these accounts are compatible with the data to be presented in this dissertation. As mentioned above, I explore the movement account herein.

[3] Expletive "the" appears in generic nouns and body parts in English; "the lion is the king of the jungle"; "I hit him on the nose." These expletive determiners carry no semantic content and, in English can only combine with singular nouns (cf. Baauw 2002).

This thesis is organized as follows. In Chapter 2 I will review the literature on the syntax of DP, its acquisition and evidence for an underspecified DP in the adult grammar. In Chapter 3 I will lay out the differences between partitive and pseudopartitive. I will give evidence for the difference in their syntactic structures, introduce how adjectives modify within these structures and make predictions for acquisition. In Chapter 4 I introduce the first experiment. In Chapter 5 & 6 I discuss the other three experiments, their bearing on the hypotheses and implications for syntactic theory.

CHAPTER 2

LITERATURE ON THE DETERMINER PHRASE

This dissertation focuses on the form of DP in the partitive structure and asks what the partitive can tell us about children's acquisition of DP. I claim that there is some ambiguity in how determiners get represented in the syntax of English. Following Laenzlinger 2000 (interalia), I assume that DP has multiple nodes/levels in its syntactic projection – corresponding to various semantic, syntactic and pragmatic features. I claim that DP is sometimes projected without the entirety of its layers, at least in the partitive structure, but arguably in many other parts of the grammar as well. Children, faced with this inconsistent input, will be less likely project a complete DP for these structures during the acquisition process than they are for constructions in which the formation of DP is clear. In this chapter I present literature on DP that shows some complexity in its syntactic structure. I present evidence that children (and some adults) do not always fully project the syntactic structure and/or semantic features that standard theory assumes are required in English. In §2.1, I review a subset of the literature on the structure of DP. In §2.2, I discuss literature on children's acquisition of DP. In §2.3, I present some literature giving evidence for a semantically weak DP in the grammar of some adult English speakers. In §2.4, I synthesize the literature and present some hypotheses about the emergence of DP that will be taken up in Chapter 3 with regard to the acquisition of the partitive.

A review of the literature on the structure of the partitive can be found in Chapter 3.

2.1 The Structure of DP

Syntactic theory presents us with many representations of nominal structure. Most syntacticians (starting with Abney 1987) are in agreement that the Determiner Phrase marks the edge of the nominal projection.

Cinque 1994 suggests that the Determiner Phrase can be split into a number of levels, just like the "exploded IP," to include agreement nodes and functional nodes that correspond to semantic features (see also Giusti 1997, Aboh 2000, Laenzlinger 2000, Zamparelli 2000, Longobardi 2001, interalia).

There have been some claims that DP is not always projected for all nominal items. Chomsky (1995) suggests that DP will be projected if specificity and/or referentiality are present (see also de Hoop 1992). Bošković 2008 claims that languages that lack articles, such as Serbo-Croatian, lack DP altogether (see also Fukui & Speas 1986).

In order to account for adjective movement in French, Laenzlinger (2000) claims that there are two DP layers corresponding to weak and strong semantic information. This is similar to the account of Zamparelli (2000) who also advocates a multi-layer DP corresponding to semantic features. These accounts have a layer for weak determiners and a layer for strong

determiners.[4] How many nodes DP has (and whether it is always projected) will remain an open question throughout this dissertation. Laenzlinger (2000), like Zamparelli, has two DP layers. The higher DP ($DP_{external}$) is the locus of discourse-related information, such as referentiality. Laenzlinger suggests that adjectives are generated in the domain of the lower (weak) DP and then move to the higher DP domain (along with the noun and determiner) to check strong semantic features. Laenzlinger's account is discussed in detail in Chapter 6, where I will follow Laenzlinger's account and attribute the ability of children (and some adults) to allow adjectives to modify through the DP layer to a lack of $DP_{external}$.

Many accounts assume that DP is a phase. Phases are barriers to most types of movement. If DP is a phase, it should block adjectives from moving out of the nominal projection.[5] DP's position at the edge of the nominal projection and its parallelism to CP (Hiraiwa 2005) support the claim that it is a phase. However DP's phasehood is still debatable. Matushansky (2005) argues that the computational complexity of the English DP, its morpho-phonology and its ability to block movement suggest that it is a phase. However, she also argues that some of its syntactic properties, such as the valuation of case, require it *not* to be a phase. Whether or not DP is a phase will not be directly addressed in this dissertation. I mention it here because of the correlation between phasehood and barrierhood. I will present evidence from experimental work on the partitive that shows DP is not always consistent in its behavior and ability to block movement. This inconsistency in its behavior may reflect the

[4] Weak and strong determiners are generally defined following Milsark 1977. This dissertation focuses, however, on the existence of weak definite determiners, specifically "the", in contexts such as "John read the newspaper." This usage is non-referential.

[5] The fact that adjectives don't move out of DP seems quite likely –as evidenced by the fact that it is extremely rare to see an adjective modifying a noun from a position to the left of the determiner.

conflicting data pointed out by Matushansky 2005. In this dissertation I will refer simply to DP's barrierhood. Whether DP's general ability to block movement supports a phase-hood account is left to the reader to consider.

The various aspects (and potential aspects) of DP described above paint a complicated picture for children acquiring the DP structure. A child acquiring her respective language must not only decide whether DP is present or not for her language, but must also sort out what nodes correspond to the variety of semantic information that can be encoded in DP. Additionally, the child must sort out how this semantic information correlates with DP structure and know how much structure to project and when.

2.2 Acquisition of DP

Acquisition of the determiner phrase, and in particular the definite determiner, has been approached by researchers from a number of angles. The definite determiner has a range of features that differ crosslinguistically. As mentioned above, there is debate whether all languages even have a Determiner Phrase. If a language has a definite determiner, its determiner will have associated semantics and pragmatics that may differ from other languages. Experimental research has shown that children don't completely master the definite determiner until roughly age 6. Exactly what is lacking at this late stage is hotly debated, with analyses falling roughly into three perspectives: pragmatics (Maratsos 1976, Karmiloff-Smith 1979, Kupisch 2006), syntax (de Villiers & Roeper 1995), semantics

(Wexler 2003) and syntax/semantics accounts in which semantic features and syntactic nodes are indistinguishable (Schafer & de Villiers 2000, Roeper 2006). Below I present a number of studies that cover this range of approaches.

2.2.1 Kupisch

Kupisch 2006a examines the naturalistic speech of one bilingual German-Italian child, Marta, from age 1;6 until 2;11. This study looks at article acquisition at a point earlier in language development than any experimental studies of articles. Kupisch claims that the acquisition of the syntax of the Determiner Phrase and the acquisition of its semantics are two separate processes. She claims that when children stop omitting articles they have gained the syntactic structure of DP and that subsequent errors with DP are due to not having sorted out all of the semantic features that correspond to the structure of the Determiner Phrase. Evidence for this comes from data showing that bilingual children show cross-language influence on their rates of determiner omission (syntax) but not on the acquisition of the semantics of determiners for each language. Determiner omission in monolingual German children lasts longer than for monolingual Italian children. However, in Marta's data there is no statistically significant difference between the various stages of article omission and article use in German and Italian. There is a significant difference in Marta's acquisition of the semantics of the articles in each language. Kupisch treats these two acquisition paths as independent entities, claiming that DP is fully formed for Marta toward the end of her second year (2;5 in Italian, 2;9 in German) when she ceases to omit articles in obligatory contexts.

In Kupisch's account (see also Kupisch 2006b –which investigates the naturalistic speech of eight bilingual children who speak German and a romance language), children initially use determiners in a highly context-dependent way, deferring to pragmatics, on a case by case basis, to make choices about how articles function. The determiner acquisition process gradually moves children from this phase toward a way of referring that is determined by the morphosyntax –including both the article and the lexical specifications of the verb that selects it. She shows parallels to her acquisition data in the contrast between DP and NP languages (languages that are supposed to have or lack DP, respectively. See §2.1 above), claiming that DP languages have simpler pragmatic systems because so much information is encoded in the D-node, whereas NP languages have complex pragmatic systems.

Children begin to obligatorily use determiners after age 2. The children in the studies in this dissertation range in age from 3 to 6. If it is true, as Kupisch claims, that the structure of DP is fully in place before age 3, then we would expect that children will not make errors such as extracting from DP in a non-adult fashion.[6]

2.2.2 de Villiers & Roeper

There is, however, a fair amount of literature that shows children older than three having trouble with the syntax of DP. The bulk of this literature focuses on wh-extraction and

[6] Unless, as suggested by Matushansky 2005, the features that make DP a barrier are semantic, rather than syntactic.

binding. In contrast to Kupisch's claims that the syntax of DP is acquired by age 3, accounts like de Villiers & Roeper 1995 show that some children erroneously extract from DP as late as age 5. Using experimental data on binding and barriers, de Villiers & Roeper suggest that children initially project just an NP and only project DP when they have sufficient evidence to do so. When children are consistently projecting DP they then master binding and barriers.

de Villiers and Roeper suggest that a lack of knowledge of binding and barriers is a diagnostic of a lack of DP. They appeal to languages like Norwegian, which allow possessives and articles to appear within the NP (Hestvik 1992) and suggest that these languages have the ability to lack a DP node even when articles or possessives are present. They suggest that in English not all determiners are alike, pointing out that only some determiners create a binding domain and these DPs are barriers to extraction. They suggest that those determiners that are instrumental in binding and barriers project true DPs and the rest are encoded within NPs, which leads to the assertion that nonspecific NPs lack DP, while specific NPs require it. In light of the variation in the English DP, de Villiers & Roeper suggest that a child under the Principle of Economy of Projection (Speas 1995) might initially project only NP and later on project DP as needed.

de Villiers & Roeper use experimental evidence to show that children who are able to correctly identify a binding domain also disallow long distance extraction from DP. Using light verb constructions in contrast with standard verbs they tested children on both barriers and binding. They assume that light verbs select for only NP and that standard verbs select

DP. Experimental results showed that children who allowed coreference in (1b) were the same children who disallowed long-distance wh-movement in (2b).

(1) a. Bert made the decision to shave him.

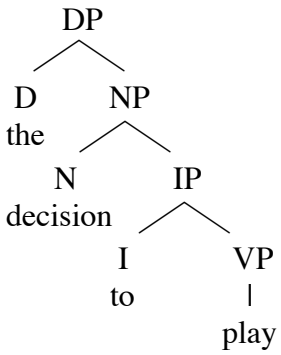
b. Bert liked the decision to shave him.

(2) a. When did the girl make the decision to play?

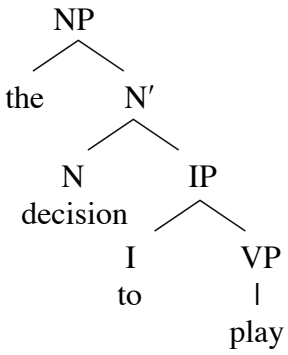
b. When did the girl like the decision to play?

de Villiers & Roeper do not commit to a particular position for the determiner when the DP node is lacking. In their trees, they put the determiner in the specifier of NP but acknowledge that there may be better ways of representing it.

(3a)



(3b)



The child who does not project a DP node (3b) will allow a reading of (2b) in which *when* has been extracted from the lower clause (the *when* referring to the time of playing). According to de Villiers & Roeper, it is a properly projected DP node that prevents the extraction of the wh-word. This analysis is revisited in §4.4.2.

2.2.3 Schafer & de Villiers

Schafer & de Villiers (2000) draw connections between the semantic features of determiners and whether the DP node is present in children's grammar. Schafer & de Villiers cite the Specificity Hypothesis (Chomsky 2000), which states that DP is only projected if specificity/referentiality is a feature encoded somewhere in the nominal projection. They claim that this implies that specific indefinites and definite determiners project the same structure, DP, and that non-referential indefinites do not. Schafer & de Villiers point out that this predicts that both specific "a" and "the" should appear in child speech at the same time. This prediction is not borne out. They argue against the Specificity Hypothesis because children master the specific indefinite long before they show mastery of the semantics of the definite determiner. Schafer and de Villiers claim that specific "a" must be in a node other than DP (they suggest NumP) and that projection of DP is triggered by Familiarity (i.e. Theory of Mind[7], which they claim is a cognitive prerequisite for projection of DP). They suggest that specific "a" has the feature [specific referent] whereas "the" has the feature [unique]. In their account, children are not projecting DP when they first start using articles. They are, instead, merging articles low on the tree in a phrase like "theP" or in spec,NP.

In a series of elicited production tasks (§2.3), Schafer & de Villiers investigate the various uses of "the" and show that children do not master them all simultaneously. Children master

[7] See Wellman, Cross & Watson 2001.

part-"the" (referring to an inherent part of a previously mentioned set) before they master familiar-"the" (referring to a previously mentioned object), which suggests that although they have encoded uniqueness as a feature on the definite article, they are not always able to compute uniqueness reliably. This suggests that the ability to project a complete DP comes in at some point after children have begun to use determiners.

2.2.4 Wexler

Schafer & de Villiers 2000 also contains data that show children using "the" in contexts where the indefinite "a" is appropriate.[8] Specifically, they erroneously use "the N" when referring to one of a set of identical (indistinguishable) Ns. This particular error is also evident in the data of Maratsos 1976 and Karmiloff-Smith 1979. The children in these studies do not make errors with "a". As an explanation of this phenomenon, both Maratsos and Karmiloff-Smith propose that children understand the semantics of the definite article, but have trouble with its pragmatics. Maratsos, following Piaget (1955), hypothesizes that children understand the semantics of "the", but they are unable to realize that the interlocutor does not share their context set. Karmiloff-Smith suggests that children's use of "the" in these cases is deictic. Both Maratsos and Karmiloff-Smith assume that the problem with children's use of determiners lies is based in lack of competence with the pragmatics of determiners.

[8] Some of the adults in Schafer and de Villier's study share this production error with the children. If this data is sound, then it may call for a reanalysis of the adult syntax/semantics of the definite article. I will return to this possibility briefly in §2.3 and in more detail in Chapter 6.

Wexler (2003), however, in his review of the above literature, claims that this data must be due to children misrepresenting the semantics of "the." Most of the literature on determiner acquisition focuses on either syntax or pragmatics. Wexler 2003 reviews a wide range of existing experimental research, including eye-tracking studies (Truswell et al 1999), and points out the necessity of factoring the acquisition of semantics into the equation.

In his review, Wexler refers to one particular experiment run by both Maratsos and Karmiloff-Smith[9] in which a story is told without pictures. Wexler references one story in the experiment in which there is a woman with many children (both boys and girls). The woman sends all the children to bed, telling them to be quiet. She hears giggling. ("*But do you know what happened? One of them started laughing and giggling*."). The experimenter then mentions again that there were X number of girls and X number of boys and asks who was giggling. In Karmiloff-Smith's study, 63% of the 6 year olds responded with a definite article and a single noun ("the boy" or "the girl") instead of replying with an indefinite determiner or a partitive ("one of the boys"). Wexler points out that if the child has full knowledge of the semantics of the definite determiner (as claimed by Maratsos and Karmiloff-Smith) and knows that the referent of "the" must be unique, then in order to felicitously answer "the boy," he has to have created an entire character in his head that is unique from all the other boys in order to refer to it. Wexler points out that this is highly unlikely and suggests, instead that children's semantic representation of the definite determiner is lacking the properties of uniqueness and Maximality. Maximality can roughly be characterized as the property of referring to *all* of a given set (the maximal number of items in the set). In the case of the

[9] Karmiloff-Smith's data is from French-speaking children. The data from both Maratsos and Karmiloff-Smith reveal the same patterns in children's use/comprehension of determiners.

definite determiner combined with a plural noun, this will pick out all the Ns delineated by context as belonging to the relevant set. In the case of the definite determiner plus a singular noun, Maximality requires that that noun be unique, the maximal amount of members in that set. This property of uniqueness is captured in Heim 1991, as illustrated in (4).

(4) In the situational context *i*, [[the x] P] expresses that proposition which is:

a. true at an index *i*, if there is exactly one x at *i*, and it is P at *i*

b. false at an index *i*, if there is exactly one x at *i*, and it is not P at *i*

c. truth-valueless at an index *i*, if there isn't exactly one x at *i*

Wexler suggests that children have a different lexical entry for "the", which he represents as *theC*. He defines *theC* by modifying Heim's analysis (5).

(5) Regardless of the utterance context, [[theC x] P] expresses that proposition which is:

a. true at an index i, if there is an x at i, and it is P at i

b. false at an index i, if there is an x at i, and there is no x such that x is P at i

c. truth-valueless at an index i, if there is no x at i

[Wexler 2003: 18]

The definition in (5) only presupposes that there is at least one x; it does not have to be unique. The meaning of *theC* can be roughly paraphrased as "one of the." This definition accounts for the child's ability to refer to "the boy" or "the girl" in Maratsos's study despite the fact that there is no individuation boys/girls in the story.

I follow Schafer & de Villiers (2000) by correlating the ability to encode semantic features with the ability to project the syntactic structure of DP. The syntactic structure is needed to house the semantic features. From this perspective, the fact that children as old as 6 are still missing the Maximality (and/or uniqueness) feature on the definite determiner suggests that their syntactic structure for DP is incomplete until quite late in the acquisition process.

2.2.5 Ramos

Ramos (2000) investigates whether children with SLI (Specific Language Impairment) are able to project DP. Ramos presents a battery of tests (seven tasks in all) on three groups of children: ten SLI children, ten Language Matched children (based on MLU) and ten Age Matched children. These experiments include the contrast between specific and nonspecific determiners (following Maratsos 1976), hierarchical structure in the noun phrase using demonstratives and possessives (following Johnson et al 1995), DP as binding domain and DP as barrier to extraction (following de Villiers & Roeper 1995). Ramos attempts to draw correlations between all of these properties of DP to get a full picture of children's acquisition. She also contrasts these data with spontaneous speech samples of each child. I focus here on her data from normally developing 3-5 year olds, as this is roughly the age group that I discuss in this dissertation. These children were successful in differentiating between "a" and "the" in terms of specificity. Ramos used a task, based on Maratsos 1976, giving children a set of toys and having them act out simple sentences using "a" and "the".

These tasks tested whether children knew that "the" referred to a previously mentioned object and that "a" referred to a member of a set. All normally developing subjects properly interpreted the "a" and "the" at least 90% of the time.[10]

The younger children (aged 3-4) had some difficulty with correctly interpreting the number in phrases that contained both demonstrative and possessive, such as (6). These children preferred that the demonstrative and the head noun ("balloon") match in number.

(6) Give the girl those bears' balloon.

The older children (aged 5) were successful in this task. The younger children also had some difficulty with possessive phrases preceded by an adjective, such as (7)[11], mistakenly allowing the adjective to modify "sign".

(7) Miss Piggy knocked over the yellow horse's sign.

Another task investigating the ability to identify hierarchical structure in the noun phrase asked children to distinguish between (8a) and (8b)[12] or between (9a) and (9c).

[10] This data does not conflict with that of Maratsos or Karmiloff-Smith (§2.2.3.1). Ramos's experiment only required that the children know that "the" is presuppositional –referring to a previously mentioned object. Children's facility with this feature of the definite article is not under debate (see also Wexler 2003).

[11] Most of those erring allowed the adjective to apply to both "horse" and "signs". This instance of adjective spreading is quite interesting in light of the data that will be discussed in this dissertation. I will return to this topic in Chapters 5 & 6.

[12] The contrast in (7) is also highly relevant to the data discussed in this dissertation. It will be revisited in Chapter 6.

(8) a. box of shoes

b. box-shoes

(9) a. flower's dress

b. flower-dress

For example, the child would be presented with two pictures ("here are some shoes that look like boxes, and here is a box with some shoes in it") and asked to point to the pictures described by (8a) and (8b).

SLI children performed at chance in correctly interpreting the items in (8) and (9). The normally developing 3-4 year olds were above chance but still only correct 65% of the time. The older children were correct 83% of the time. There was a high correlation between children's performance on the items in (7)-(9).

Based on the data from all three experiments Ramos suggests that children with SLI and their Language Matched peers (mean age 3;11) must have some ability to project DP, but only in certain contexts. These children are able to recognize DP as a binding domain and they are able to use possessive "s" in spontaneous speech.

2.2.6 Summary of the Acquisition Literature

The above review of the acquisition literature illustrates that determiner acquisition is a slow and complicated process. Kupisch suggests that children acquire the syntax of DP early, but have lingering pragmatic problems. de Villiers & Roeper, however, show that binding and barriers are not fully acquired until at least age 5, which suggests that the syntactic structure of DP could not possibly be completely acquired until later in the acquisition process. Wexler, for his part, suggests that the lingering problems with the definite determiner (specifically its use in contexts where "a" is appropriate) cannot possibly be accounted for by pragmatics alone. Both Wexler and Schafer & de Villiers suggest a lack of subtle semantic properties at this stage in the acquisition process. Schafer & de Villiers go on to equate semantic properties with syntactic nodes (following Cinque 1994, Giusti 1997, Aboh 2000, Laenzlinger 2000, Zamparelli 2000, Longobardi 2001, Roeper 2006 interalia).). I take this approach in the remainder of the dissertation –both semantic and syntactic properties are interrelated –with syntactic nodes corresponding to semantic features. A lack of one may signify (or cause) the lack of the other.

The data from Ramos, suggests a slightly earlier age for DP acquisition (3;11) and also provides some of the only existing data on how children react to adjectives modifying complex DPs of the sort investigated in this dissertation. This topic will be returned to in Chapters 3 and 6. I turn below to the discussion of adult (mis)representation of the syntax/semantics of the definite determiner. If it is the case that adults have some trouble

with projecting or interpreting DP, then children's lengthy acquisition process would be even more plausible.

2.3 Some Evidence for an unexpected Weak DP in English

In this dissertation I show that children and some adults are not projecting DP as a barrier to adjectival modification in the partitive structure (see Chapter 3 for a description of adjectival modification from a distance as adjective movement). The determiner corresponding to N2 in the partitive (10) has traditionally been assumed to project a full DP (cf. Jackendoff 1977).

(10) He got a piece of <u>the</u> pie.

If an English speaker does not consistently project DP in the partitive, we must either assume that something is odd with the partitive or that determiners are not always projected as full DPs (or projected at all). In the previous sections I have shown some evidence that children don't always project a full DP. Some of these accounts also claim or imply that DP is not always fully projected in the adult grammar and that this might be due to syntactic and/or pragmatic situations.

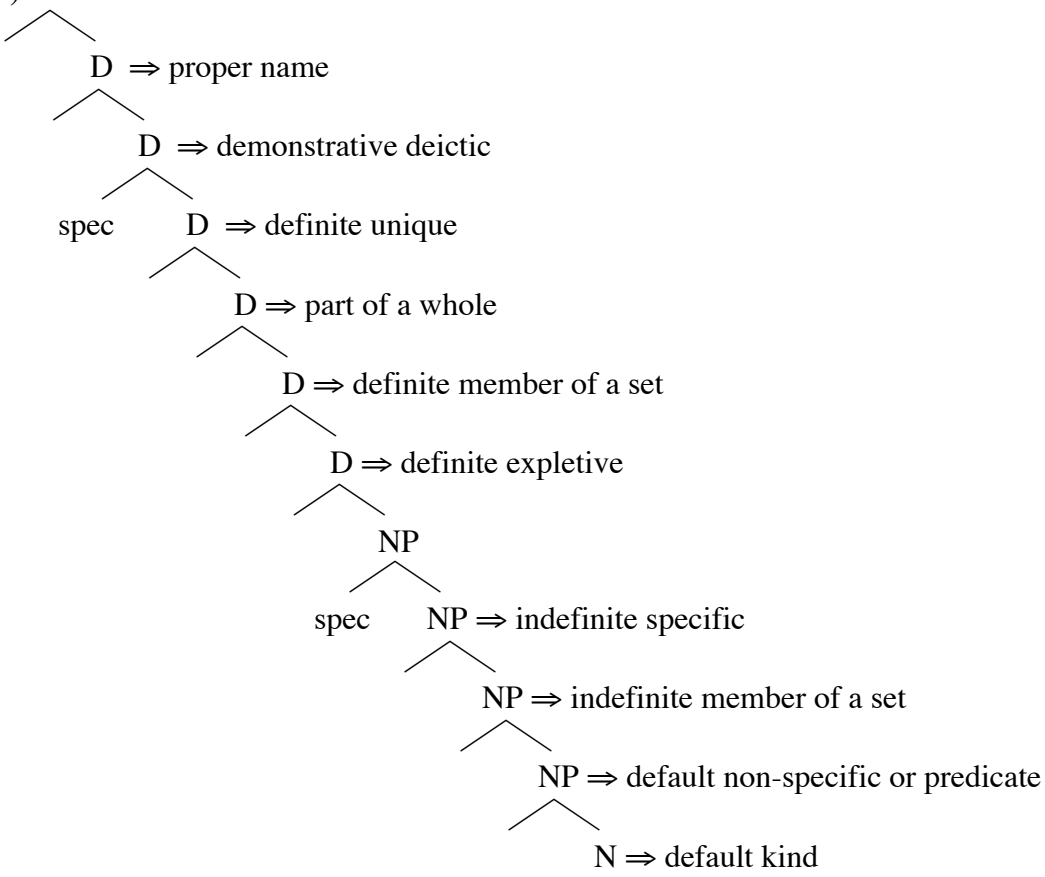
As mentioned above, the Specificity Hypothesis (Chomsky 2000) claims that DP is only projected if specificity/referentiality is a feature encoded somewhere in the nominal projection. And indeed, it is clearly the case that some uses of the definite article in English,

such as the expletive “the” found in generics (11), do not encode referentiality or specificity (Longobardi 1994).

(11) The lion is generally described as the king of the jungle.

Following Chomsky, the lack of specificity in (11) suggests that not all uses of the definite article are encoded as DP in the adult grammar of English. In fact, Roeper 2006 suggests over 16 different (possible) articulated nodes in the noun projection that correspond to various semantic features. These nodes are divided into a hierarchy, the higher nodes being considered part of DP and the lower nodes being associated with NP. The majority of these nodes fall within DP (12).

12) DP



[Roeper 2006: 46]

Roeper suggests that children might initially project a single NP and build more nodes as needed as they master the various semantic aspects of the English noun system. Applying the logic of the Specificity Hypothesis to Roeper's tree, we could imagine an adult grammar in which only part of DP would project if the determiner was not encoding strongly referential semantic information as in (13).

(13) I picked up Jane's thermos and unscrewed <u>the</u> lid.

There are certainly cases in English where a definite determiner is present and yet the determiner doesn't project a barrier to movement. If the barrier feature is located in a higher node in the DP structure, then we'd expect that if the determiner didn't have strong enough features, only the lower DP nodes would project and hence there would be no barrier to movement. de Villiers & Roeper (1995) point out that in English the definite determiner is sometimes a barrier to long-distance movement (and a binding domain) and sometimes not (§2.2.2).

This sort of economy could be a very straightforward and articulated system in the adult grammar: if semantic information is present, project as much structure as necessary to host it and no more. However, it appears that some adults have difficulty representing all the semantic features of DP in cases that we, as linguists, view as straightforward. Schafer & de Villiers (2000) present data that show that some of their adult controls erroneously use "the" in cases where the property of uniqueness/Maximality is missing. Regardless of which prompt they were given (a or b), 30% of the adult controls in their child language study answered "the duck" to the scenario in (14).

(14) Three ducks and two dogs were walking across a bridge. One of the animals fell off the bridge and said "Quack".

a. Guess which.

b. What was it?

The answer should have been "a duck" or "one of the ducks", indicating specific indefiniteness. If we use an analysis where discourse and semantic features are encoded as nodes/layers of DP, then we must conclude from the adult data that 30% of adults in these contexts are not projecting a full DP –and yet using a determiner that requires a higher projection. This leads to an analysis in which these adults are interpreting "the" as being in a lower node with a weaker semantic interpretation than is standardly assumed. The percentage of adults behaving this way is large enough to suggest that it is an option in the grammar of English to not project a full DP. Or perhaps there is a subset of the adult population who semantically underspecify DP.

Another possibility is that there was some flaw in Schafer & de Villiers's experimental design. However, if we look at psycholinguistic evidence from studies on adults we see further evidence of a percentage of adults who do not seem to be treating the definite determiner as if it had all of its semantic features. Incidental data from Carlson et al 2006 show this pattern.

Carlson et al use psycholinguistic data (as well as distributional and interpretive arguments) to argue for the existence of a semantic class of Weak Definites, which share a semantics with bare count singulars but not with definites more generally.[13] Carlson et al looked at the contrast between Weak Definites, like "the" in "the newspaper", to true definites, like "the" in "the book". They establish that Weak Definites pattern with Bare Singulars. They both

[13] This, in itself, adds another facet to the complexity of the DP –especially if we are equating different semantic features with unique syntactic nodes.

lack the requirement of referential identity. They are also both licensed in particular areas of co-occurrence: usually verb-noun (14-15) or preposition-noun (16-17)).

(14) He missed *class* [Bare Singular]

(15) He missed *the bus* [Weak Definite]

(16) He's at *school* [Bare Singular]

(17) He's in *the hospital* [Weak Definite]

Carlson et al look experimentally at the contrast between these Weak Definites and true definites using judgment surveys, eye-tracking and picture choice tasks. These experiments verify that there is a concrete psychological difference between a Weak Definite and a regular definite. In one experiment, subjects heard Weak and regular definites in sentences like (18) and accepted or rejected pictures where the object noun represented one or two distinct entities.

(18) Jane read the newspaper/book and John did, too.

When a Weak Definite ("the newspaper") was used, 74% of subjects accepted the sentence in a scenario containing two nouns (John and Jane read different newspapers). Only 24% of subjects accepted the use of a regular definite ("the book") in a scenario containing two nouns (John and Jane read different books). A second experiment used picture choice (plus eye-tracking), where subjects chose between pictures containing sets or singletons based on whether they heard a Weak Definite ("the newspaper") or a regular definite ("the book"). In

this experiment, 61% of subjects chose a member of a set for Weak Definite cases. Only 33% of subjects chose a member of a set when they heard a regular definite.

I point the reader here, however to a particular piece of Carlson et al's psycholinguistic data. In both Experiment 1 and Experiment 2 there is a segment of the adult population (24% & 33% respectively) who accept the definite determiner in contexts where only a Weak Definite should be acceptable. I claim that the data from Carlson et al 2006 in combination with the data from Schafer & de Villiers 2000 show that there is a segment of the adult population who are not representing the semantics of DP in the manner assumed by the standard literature on the topic. This claim combined with the theory that syntactic structure is projected to house semantic information leads to the conclusion that a segment of the adult population is under representing the syntax of DP.[14]

If it is indeed true that 25% of the adult English-speaking population has a different syntax/semantics for definite determiners, we'd expect that this might function as imperfect input for the child's language acquisition process –potentially causing additional delays in the acquisition of DP structure. If we assume that children can overcome this imperfect input, we are still left with the idea that 25% of language learners reach adulthood without ever reaching the "target grammar." I will leave this issue aside for now and revisit it in Chapter 6.

[14] An alternate possibility is that the syntax/semantics of definite articles has yet to be correctly analyzed by linguists –giving rise to what appear to be errors in the grammar of some adults.

2.4 Predictions for DP Acquisition

As we can see from the above discussion, the semantics of the English DP is complicated and varied. It has a complex syntactic structure that may be projected to various degrees depending on semantic content. Additionally, what semantic features are encoded and how much structure the DP contains varies from language to language. Children acquiring English must first establish whether their language has DP and then what semantic features are encoded there and how this affects the DP's syntactic properties. In addition, children are faced with numerous subtly different semantic uses of the definite article in daily speech.

(19) "In Berlin, when you're the black guy on the street, you're THE black guy on the street."

[Mark Stewart interview; Studio 360: #912[15]]

Children sifting through this data will need a powerful organizational strategy. They will want to choose the structure that is the most economical that fits the data. I present the following hypotheses based on the claim that the DP has a number of syntactic nodes that correspond to a series of semantic features (just what nodes and features and how many will be discussed in Chapter 6). These hypotheses address specifically the acquisition of the complex syntactic structure of DP. I have labeled them with the subscript "dp" for reference when I return to them at the end of Chapter 3.

[15] From "Passing Strange." *Studio 360 (#912)*, National Public Radio. March 21, 2008.

$H0_{dp}$: Children have a fully articulated adult-like DP structure from the beginning (or from the first instance of identifying determiners in the language).

$H2_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. Once they identify DP they project it fully everywhere.

$H3_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. They are aware that determiners can have a variety of features. Until they have fully acquired a construction, they will project minimal DP structure and look for pragmatic cues as evidence for more DP structure.

Because of the existence of an expletive "the" in English and definite determiners which are non-barriers, such as in the phrase "make the decision", it must be assumed that children have to analyze constructions containing definite determiners on somewhat of a case by case basis. From this we can split H3 into two sub-hypotheses.

$H3a_{dp}$: Once children have mastered a range of constructions containing DP in English, they will begin to project a full DP as the default when encountering new constructions. This is the adult grammar/strategy.

$H3b_{dp}$: Regardless of how many DP-containing structures the child encounters, he will continue to project the minimal DP as the default when encountering new constructions. This is the adult grammar/strategy.

I will return to these hypotheses at the end of Chapter 3, at which point I will refine them and make predictions for the acquisition of the partitive structure.

The English DP is a very complex domain that has a number of complicated syntactic, semantic and pragmatic features. In this dissertation I approach the language acquisition data with the assumption that semantic and pragmatic features correlate with syntactic nodes. It is my position, in keeping with Roeper 2006, that children start out with NP, and, as they gain evidence for syntactic behaviors that are dependent on semantic/pragmatic features, that they will begin to project more and more of the DP structure until they gain the full DP of the adult grammar. I also argue that there are some adults who may never fully reach the stage where all semantic/pragmatic features correlate with syntactic function.

CHAPTER 3

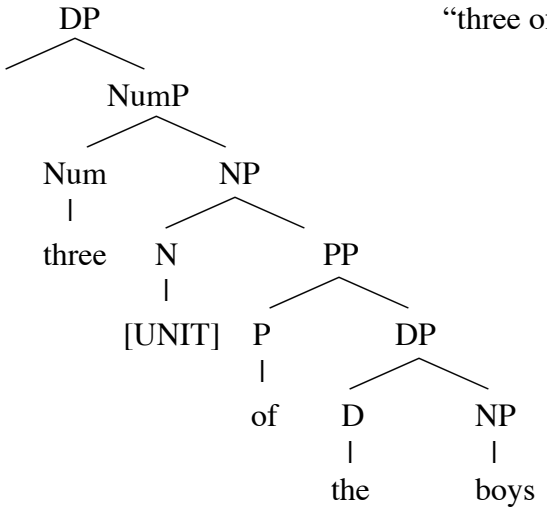
THE PARTITIVE AND THE PSEUDOPARTITIVE

The partitive is a complex noun phrase. This dissertation focuses on the acquisition of the determiner that appears between the first and second noun (N1 and N2 respectively), which in turn I use as a diagnostic for partitive acquisition. In order to accurately capture what children know about the partitive, I contrast it experimentally with the pseudopartitive, which is a single nominal projection (Chapters 4 & 5). In the first part of this chapter, I will introduce the structure of the partitive and lay out what children must know in order to fully master it (§3.1). In §3.2, I will discuss the syntax of both the pseudopartitive and the partitive and motivate the difference in their structures. In §3.3, I will focus again on DP and discuss the use of adjectival modification as a diagnostic for the DP in the partitive. The difference between partitive and pseudopartitive and their contrastive interaction with adjectives is the basis of the experimentation in Chapters 4 and 5.

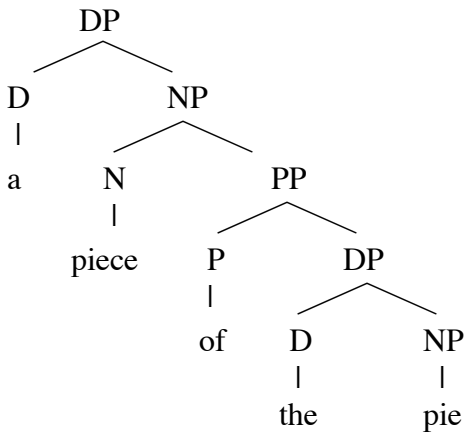
3.1 Partitive Structure

Semantically, the partitive denotes a proportion of a larger discourse-relevant set. Syntactically it is an NP within an NP. A number of syntactic structures have been proposed for the partitive (Jackendoff 1977, Hoeksema 1996, Zamparelli 1998, interalia). All of these accounts are consistent in the idea that the partitive contains two NPs. I will use the structure

shown in (1) and (2), which I propose in Stickney 2004. This structure incorporates the partitives of Jackendoff (1977) and Hoeksema (1996).

(1) 

"three of the boys"

(2) 

"a piece of the pie"

The partitive's first noun (N1) is the head, denoting a subset (or certain individuals) of a larger, discourse relevant set (denoted by the second noun, N2). This dissertation will focus on partitives like (2). I present (1) because it is the more common partitive in everyday speech. I also present it to show that all partitives have the same structure, regardless of

whether they have two phonetically realized nouns or not (Jackendoff 1977, Hoeksema 1996, Kayne 2002). I will only briefly revisit this type of partitive, focusing instead on partitives in which both N1 and N2 are phonetically realized. These partitives can easily be investigated in contrast with pseudopartitive minimal pairs (§3.2).

3.1.1 The Acquisition Challenge

There does not exist any literature on children's acquisition of the syntax of the partitive. For this reason, it is useful to discuss here just what the child must learn in order to acquire the partitive successfully. The partitive is a complex noun phrase, it has many properties, both syntactic and semantic, that must be learned. I will list the properties here and then discuss them more fully in subsequent sections.

Syntactically, the partitive is a complex noun phrase. It is a head-complement structure, one NP inside another (Jackendoff 1977). Children must master this as well as know that the partitive is a structure unique from a numeral construction, quantifier construction or pseudopartitive. Two NPs are always present in the syntax, regardless of whether N1 is lexically realized (e.g. they must know that *three of the boys* (1) contains two nouns, even though only the second one is pronounced).

Semantically, the child must know that the N2 designates a set and that N1 designates a unit/proportion of the set designated by N2.

Children must also learn the language-particular aspects of how their partitive is formed, e.g. syntactic structure (English) or case marking (Finnish). They must also learn which quantifiers require a partitive structure for their particular language and which don't. In English, for example, a DP dominates each NP in the partitive and the DP associated with N2 creates a barrier to movement (§3.2).

3.1.2 Language Particular Partitive Acquisition

Each child must learn his language's particular way of expressing the partitive syntactically. Most languages use a structure that looks similar to the language's genitive (3-4).

(3) un kilo de aquellas manzanas [Spanish partitive]
a pound of those apples
"*a pound of those apples*"

(4) la casa de la costurera [Spanish possessive]
the house of the seamstress
"the seamstress's house"

Some languages, such as Finnish (5) use case marking to distinguish the partitive.

(5) pala tästä hyvästä kakusta
bit:NOM this:ELAT good:ELAT cake:ELAT
'a bit of this good cake'

[Rutkowski 2007 :341]

In most languages the partitive construction contains a determiner on N2 signifying the discourse relevant set of which N1 is denoting a subset.[16]

This chapter will focus on languages whose partitives contain two DPs (determiner + noun) with an intervening preposition. The claims I make hold true for these languages. The following properties of the partitive hold for English but also, for the most part, hold crosslinguistically. I focus herein on the acquisition challenge for children acquiring English.

3.1.3 N2 is a Complement

To show mastery of the English partitive, children must know that N2 is part of a head-complement structure. The lower PP-NP is not an adjunct. This is illustrated by the fact that "ones" must refer to the whole construction, not just the head (6). The head requires its complement. This contrasts with a prepositional adjunct structure like (7). The fact that N1 cannot take an adjunct modifier (8) is also evidence for a head-complement structure. Nothing can come between a head and its complement, thus material intervening between N1 and N2 is disallowed.

[16] Lithuanian does not contain a determiner on N2 and uses word order alone to distinguish a partitive from a pseudopartitive. See Koptjevskaja-Tamm 2001 for a thorough typological survey and discussion of diachronic data on the partitive and the pseudopartitive.

(6) a. groups of the men from Siberia and ones from Japan (= groups of the men from Japan)

b. *groups of the men and ones of the women

c. *a plate of the cookies and one of the cake

(7) a. a plate with cookies and one with cake

(8) a. a gallon of the wine in the kitchen

b. *a gallon in the kitchen of the wine

[Jackendoff 1977: 107-108]

3.1.4 N1 is Always Present

A child who has mastered the English partitive will also know that N1 is always present even if it isn't phonetically realized (Jackendoff 1977, Hoeksema 1996).

3.1.5 DP is a Barrier

Children must also master the fact that N2's DP is a barrier to movement and modification. A low attached modifier cannot extrapose from the partitive (8) and an adjective preceding the

partitive cannot modify the second noun (9). The phrase in (9) does not have a reading where the chocolates are moldy.

(8) a. Only a handful of those questions concerning electromagnetism were asked.

b. *Only a handful of those questions were asked concerning electromagnetism.

[Selkirk 1977]

(9) a moldy box of those chocolates

[Stickney 2004]

This aspect of the partitive is entirely dependent on the speaker/hearer properly projecting a DP structure. An incomplete or missing DP will cause problems for partitive acquisition. I return to this issue in Sections 3.2 and 3.3 (See also Chapter 6).

3.1.6 The Partitive is a Unique Structure

In order to master the partitive, children must recognize that the partitive is a unique syntactic/semantic construction. It is not a numeral construction, denoting "how many" (10), it is not (uniquely) a quantifier construction (11), nor is it a pseudopartitive (See §3.2). The partitive is, instead, a unique construction that denotes "what proportion of" (12).

(10) three boys (numeral construction)

(11) many/most boys (quantifier construction)

(12) three/many/most of the boys (partitive)

Unlike numeral and quantifier constructions, the partitive requires that the thing being measured is something that is already salient in the discourse (Ladusaw 1982).

This dissertation cannot cover all of the areas discussed in §3.1.1-3.1.6, so the focus here is narrowed considerably. The question I focus on is whether children are aware that the partitive is a complex noun phrase. Do children know that it contains two NPs, rather than a single NP that is dominated by a number of modifiers like the pseudopartitive? Do they know that the combination of these two NPs mediated by a DP creates a barrier to modification and movement?

3.2 The Partitive/Pseudopartitive Contrast

How do we test whether children know that the partitive is bi-phrasal and contains an internal barrier? The most convenient way to do so would be to use a minimal pair; a phrase that is identical, except that it contains only one NP. The pseudopartitive is just such a phrase.

The partitive (13-15) and the pseudopartitive (16-18) are very similar on the surface[17] – differing only in the presence or absence of a definite determiner.

partitive**:**

(13) a cup of the tea

(14) a bottle of his wine

(15) a bunch of those flowers

pseudopartitive**:**

(16) a cup of tea

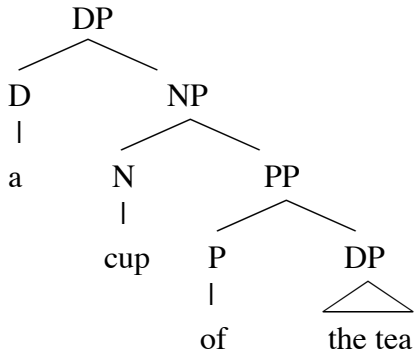
(17) a bottle of wine

(18) a bunch of flowers

The difference between partitive and pseudopartitive, however, goes beyond the existence of a definite determiner (Selkirk 1977, Jackendoff 1977, Deevy 1998, Koptjevskaja-Tamm 2001, Stickney 2004, Alexiadou, Haegeman & Stavrou 2007, Rutkowski 2007). I use the structures of Stickney 2004 for the partitive and the pseudopartitive, which I will motivate in this chapter. I argue that the partitive and the pseudopartitive have different structures, and that this difference is due to the fact that "of" in the pseudopartitive is not a preposition, and the first noun in the pseudopartitive is not a noun. The partitive (19) is a complex noun phrase. It is headed by N1. N1 in turn has a prepositional complement, whose complement is a DP (N2).

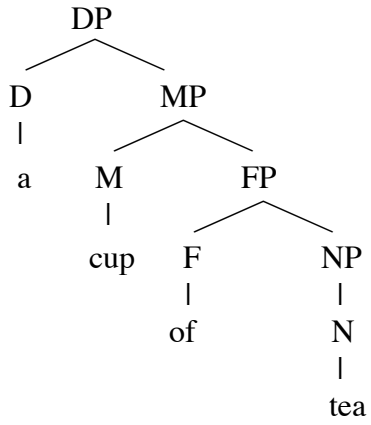
[17] In these studies I only use partitives that can be minimal pairs with pseudopartitives. This necessarily leaves out quantification ("each of the boys") and numerals ("three of the boys").

(19) [partitive]



The partitive is a bi-phrasal structure with one DP embedded inside another (by way of a PP). The pseudopartitive, on the other hand, is a single nominal projection (20).

(20) [pseudopartitive]



The partitive and the pseudopartitive appear similar on the surface, but what is the head noun in the partitive, "cup", is a syntactic measure phrase, MP, in the pseudopartitive. And what is a preposition in the partitive, "of", is really a functional node in the pseudopartitive (See §3.2.1).

This dissertation uses adjectival modification as a diagnostic for the difference between partitive and pseudopartitive (See §3.3), but these two constructions differ in a range of ways. The partitive and pseudopartitive differ in their behavior with regard to extraposition (Selkirk 1977, Stickney 2004), adjectival modification (Selkirk 1977, Deevy 1998, Stickney 2004, Alexiadou, Haegeman & Stavrou 2007), s-selection (Selkirk 1977, Deevy 1998, Alexiadou et al 2007), preposition stranding (Alexiadou et al 2007), fronting of the "of" phrase (Stickney 2004, Alexiadou et al 2007) and recursion (Stickney 2004). Languages like Greek, Dutch or German provide us with a further difference. In these languages the pseudopartitive is not only lacking a definite determiner, but it also lacks a preposition mediating between the two nouns (21b).

(21) Greek

a. mia kouta me ta vivlia [partitive]
a box with the books
"*a box of the books*"

b. mia kouta vivlia [pseudopartitive]
a box books
"*a box of books*"

Previous analyses have attempted to account for a number of the above differences by proposing various syntactic structures for the pseudopartitive with varying degrees of success (Jackendoff 1968, Selkirk 1977, Corver 1998, Deevy 1998, Stickney 2004, Alexiadou, Haegeman & Stavrou 2007). In this chapter I will give evidence for the structure promoted in Stickney 2004 for the English pseudopartitive, arguing for two (relatively) novel phrases

within DP: MP and FP. The use of these phrases is motivated by the properties of the pseudopartitive. Once the difference between these two constructions is clearly established, I will focus specifically on the behavior of adjectival modification in these two constructions (§3.3) and use this as a diagnostic to experimentally test whether children treat the partitive as a construction that is different from the pseudopartitive (Chapters 4 & 5).

The structures in (19) and (20) account for problems presented by previous structures of Selkirk (1977), Deevy (1998), and Alexiadou, Haegeman & Stavrou (2007). In the following sections I will present and motivate these structures and also present new evidence of the difference between partitive and pseudopartitive, showing that the pseudopartitive is not recursive (§3.2.3.3). This research supports the growing body of literature that suggests an expanded number of nodes within the DP (Cinque 1994, Zamparelli 2000, Laenzlinger 2000, Longobardi 2001, interalia). I will discuss the above topics and I will also touch upon the notion of that many of these nodes may be "semi-lexical" in nature --having both functional and lexical properties. The notion of semi-lexicality (Löbel 2001, Alexiadou, Haegeman & Stavrou 2007) within the pseudopartitive will be touched upon throughout the chapter.

In the following section I argue for the structure of the pseudopartitive given in (20) and its difference from the partitive. This will lay the groundwork for the experiments in Chapters 4 and 5.

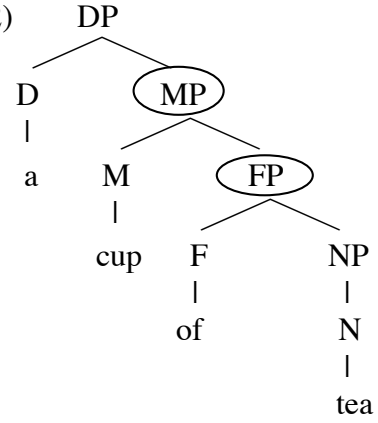
3.2.1 Properties of the Pseudopartitive

In contrast to the partitive, the pseudopartitive is a single nominal projection that is dominated by a syntactic[18] Measure Phrase (MP) and a non-prepositional functional projection headed by "of", (FP). Similar projections have been proposed for the pseudopartitive (e.g. MP in Alexiadou, Haegeman & Stavrou 2007 and FP in Corver 1998, Deevy 1998, den Dikken 1998 and Kayne 2002), but the combination here is unique.

The pseudopartitive (22) differs from the partitive (23) in that it is headed by N2. Mediating between N2 and its determiner are a functional (non-prepositional) "of" and an MP.

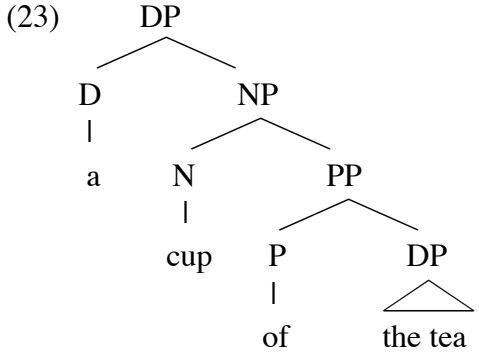
pseudopartitive:

(22)



partitive:

(23)



[18] As opposed to a semantic Measure Phrase such as in Schwarzschild (2002).

3.2.1.1 Measure Phrase

The Measure Phrase is a functional projection located beneath the Quantifier Phrase (QP) (Alexiadou, Haegeman & Stavrou 2007). It is a simplification to call a Measure a purely functional category (cf. Löbel 2001, Schwarzschild 2002 and Alexiadou, Haegeman & Stavrou 2007), but a complete discussion of this issue is beyond the scope of this paper.

MP is not an NP, although elements occurring in MP may seem quite noun-like (e.g. "a *carton* of milk"). Note also that by suggesting that a MP is its own projection I claim that a Measure is not a quantifier or a number. This is supported by the fact that Measure can appear alongside quantifiers and/or numbers (24-26).

(24) three cups of coffee

(25) many groups of men

(26) every five bottles of ketchup [… that he buys wins him a prize]

The Measure Phrase is unique from nouns in a number of ways. A Measure (26) cannot take the same complements as a noun (27). They select for only a subset of noun complements, specifically mass nouns or plural count nouns.

(26) A lot of marbles/cake/*a tricycle

(27) A picture of marbles/cake/a tricycle

Measures do not head a nominal projection, but are part of a nominal projection with its own N head. Measures cannot be s-selected by verbs. In (28) the verb refers to *tea*, the head, and not *cup*. Measures also cannot trigger verbal agreement (29).

(28) John drank a cup of tea.

(29) A lot of marbles are/*is about to fall on the floor.

Clearly this is not the whole story here, due to the existence of sentences like (30-31). The pseudopartitive is ambiguous in structure (See Chapter 6 for an in depth discussion of ambiguity).

(30) John smashed a bottle of wine.

(31) A cup of marbles is about to fall on the floor.

Alexiadou, Haegeman & Stavrou (2007) claim that the pseudopartitive is, in fact, not ambiguous and has only one structure. They suggest that the Measure Phrase is a semi-lexical projection, which has enough nominal features to trigger agreement but is never truly the head of the projection. Their analysis uses Greek pseudopartitives, which I suggest may, in the end, be different from English pseudopartitives.[19] The ambiguity of the pseudopartitive structure is not an issue that needs to be solved in this dissertation (although I will suggest an

[19] English pseudopartitives seem to have a greater range of syntactic properties than the Greek pseudopartitive. For example, Greek pseudopartitives cannot be dominated by a definite determiner but English pseudopartitives can. This may be a property of English's pseudopartitive structure not being fully grammaticalized (Rutkowski 2007). See Chapter 6 for more discussion on this topic.

alternate structure in Chapter 6) because it does not directly affect the experimentation discussed in this dissertation.

At this point the reader may have noticed that the partitive also shows similar ambiguity (32-33).

(32) John drank a bottle of that wine.

(33) John smashed a bottle of that wine.

Selkirk 1977 suggests that both partitive and pseudopartitive have more than one structure, depending on semantic interpretation. I suggest here that in English the most prevalent structure for the pseudopartitive is one headed by N2 and the most prevalent structure for the partitive is one headed by N1. I will use these structures for the remainder of this chapter and in the introduction of the experiments. I will return to the issue of structural ambiguity in Chapter 6 and point out that ambiguity in the partitive is only present for a subset of adult speakers. In Chapter 6 I will also address the nature of DP in hypothetical N2-headed partitive structures, which directly ties in with the acquisition of the Determiner Phrase.

I illustrate in §3.2.3 how the use of a Measure Phrase accounts for the syntactic properties of the pseudopartitive.

3.2.1.2 The "Of"-Phrase

The pseudopartitive "of" is not a prepositional head but a functional one. It is not unheard of for an element that looks like a preposition to appear in a functional position in English. The preposition-like "for" is actually a complementizer appearing in C° (34a). This usage contrasts with the preposition "for" in (34b). I claim that "of" in the pseudopartitive is like "for" in C° or "to" in I° (35a).

(34) a. For John to appear ill is not an unusual occurrence.

b. This book is for John.

(35) a. I'm waiting for John to purchase the book.

b. I gave the book to John.

The functional items "for" and "to" in (34a) and (35a), respectively, do not contain the relational properties of the prepositions in (34b) and (35b). Instead, functional "for" serves the syntactic purpose of introducing a particular clause type. Functional "to" marks the lack of tense on infinitival verbs. Likewise I argue that "of" in the pseudopartitive is of a different nature than the partitive "of" –at least at the level of the syntactic features that it encodes (cf. van Riemsdijk 1990).

In contrast to the preposition "of", the pseudopartitive "of" cannot extrapose with its complement (§3.2.3.1), cannot front with its complement (36), potentially cannot strand (38) and is not a barrier for extraction (40).

(36) *Of apples, I ate a pile.

(37) Of that beautifully striking tree, I took a really neat picture.

(38) *These are apples that I ate a pile of.

(39) This is the tree that I took a picture of.

(40) a. John wanted a basket of [cheese from France]

b. Where$_j$ did John want a basket of [cheese from t_j]?

(41) a. John wanted a picture of [a man from France]

b. *Where$_j$ did John want a picture of [a man from t_j]?

By having "cup" and "of" as Measure Phrase and functional projection, respectively, the difference between partitive and pseudopartitive is quite easily captured. In the following section I will briefly sketch how these two nodes to account for differences in syntactic behavior between the two constructions.

3.2.3 Differences in Syntactic Behavior

In this section I will illustrate some of the ways in which the pseudopartitive differs from the partitive. Each of these differences is a potential diagnostic for the identity of the partitive

structure. I will then focus on the behavior of adjectival modification (§3.3), around which this dissertation is based.

3.2.3.1 Extraposition

The partitive allows extraposition of "of DP" (42), while the pseudopartitive does not allow extraposition of "of NP"(43), (Selkirk 1977).[20]

(42) a. A lot of the leftover turkey has been eaten.

b. A lot has been eaten of the leftover turkey.

(43) a. A lot of leftover turkey has been eaten.

b. *A lot has been eaten of leftover turkey.

[Selkirk 1977: 304]

With respect to extraposition of a modifier attached to N2, the situation reverses. The partitive does not allow extraposition of a modifier (44). The pseudopartitive allows such movement (45).

[20] This extraposition contrast between partitive and pseudopartitive holds for languages like Spanish and French that have preposition-like connector "de" between the first noun and the second noun in the pseudopartitive. The contrast also holds for the languages, like Greek, that do not have a morpheme connecting the two nouns in the pseudopartitive, but the data for modifier extraposition (44-45) is still somewhat murky and needs to be worked out more clearly.

(44) a. Only a handful of those questions concerning electromagnetism were asked.

b. *Only a handful of those questions were asked concerning electromagnetism.

(45) a. Only a handful of questions concerning electromagnetism were asked.

b. Only a handful of questions were asked concerning electromagnetism.

The structures given for the partitive (23) and pseudopartitive (22) account for the contrast in (42-45), given a locality constraint like the Phase Impenetrability Condition (46), as we shall see in the following subsections.

In this chapter I follow Kayne 1994 in assuming that extraposition is movement.[21] I assume that PPs and CPs are the only phrases that extrapose (Baltin 2004). Movement out of DP is constrained by the Phase Impenetrability Condition (PIC) (46).

(46) **Phase Impenetrability Condition**: In phase α with head H, the domain of H is not accessible to operations outside α, but only H and its edge. (Chomsky 2000)

In order to extrapose, a phrase must first move to the edge of DP before it can move further. For the purposes of this chapter, I consider phases to be CP, DP and, following Sabbagh

[21] Extraposition as movement is not a universal assumption. A few linguists have claimed that extraposition is instead base generated adjunction (cf. Culicover & Rochemont 1997). However, the majority of accounts assume that extraposition is movement out of a DP. Initial accounts of extraposition assumed that it was movement to the right (Ross 1967, Jackendoff 1977), but a growing number assume movement to the left (Kayne 1994, Haider 1997). Those who assume movement to the right agree that extraposition is constrained by some version of Ross's (1967) Right Roof Constraint, which asserts that a phrase may not move rightward further than immediately out of the CP in which it is generated (Ross 1967, Akmajian 1974, Wexler & Culicover 1980, McCloskey 1999, Sabbagh 2004).

2004, PP. I define these as phases only in terms of their ability to block movement and do not make ultimate assertions about the nature of DP (cf. Matushansky 2005).

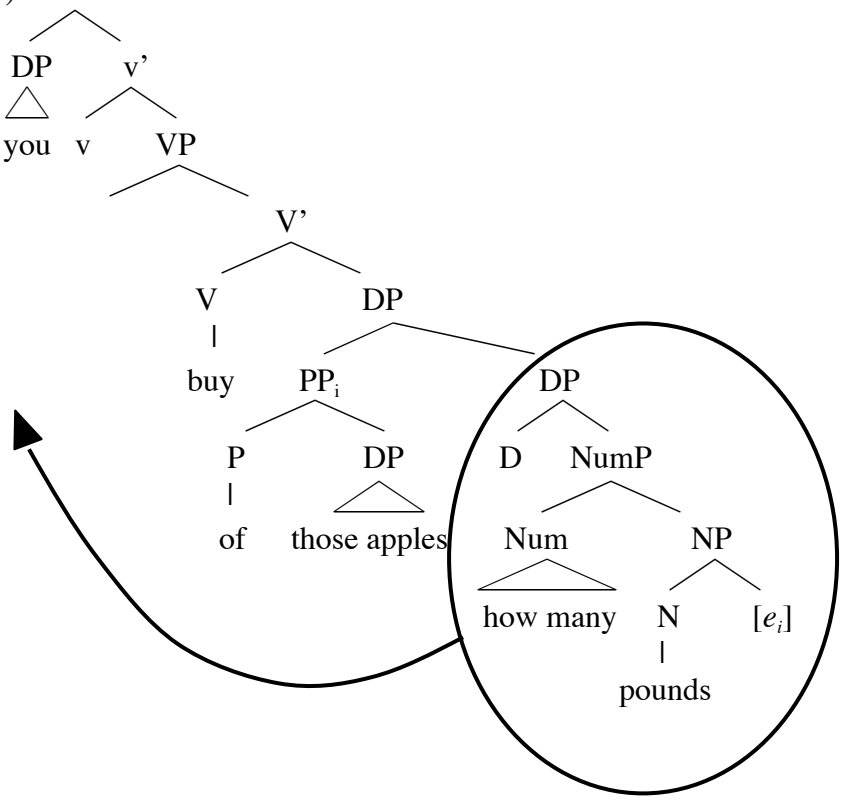
In this analysis I use a leftward moving approach to extraposition (following Kayne 1994). In the derivations below, I assume the extraposed element moves and adjoins just above the object of the verb and then is left behind when the remnant of the object of the verb moves to subject position during passivization or question formation. The focus here is only on the movement of PPs out of pseudopartitives and partitives. I make no claims that *all* extraposition is leftward movement (see Kayne 1994 or Haider 1997 for further discussion). Regardless of which direction one assumes an extraposed element is moving, the constraints on *what moves* and *how far* are relatively the same, allowing us to argue for the partitive and pseudopartitive structures (22-23).

As discussed above, the two main constraints on extraposition from the partitive and the pseudopartitive used in this paper involve phrase type and locality. For partitive extraposition (47b), the PP "of those apples" starts out attached to NP and moves locally to adjoin to DP. The remnant "how many pounds" then moves from the object of VP to its surface position as passive subject (48).

(47) a. How many pounds of those apples did you buy?

b. How many pounds did you buy of those apples? [Selkirk 1997: 306]

(48) vP [partitive]



In the partitive structure, the PP can extrapose. At the beginning of the derivation, the prepositional phrase ("of those apples") moves locally, adjoining to the dominating DP. [22] The remnant DP, in this case [$_{DP}$ [$_{NumP}$ how many [$_{NP}$ pounds [e_i]]]], then moves to its surface position.

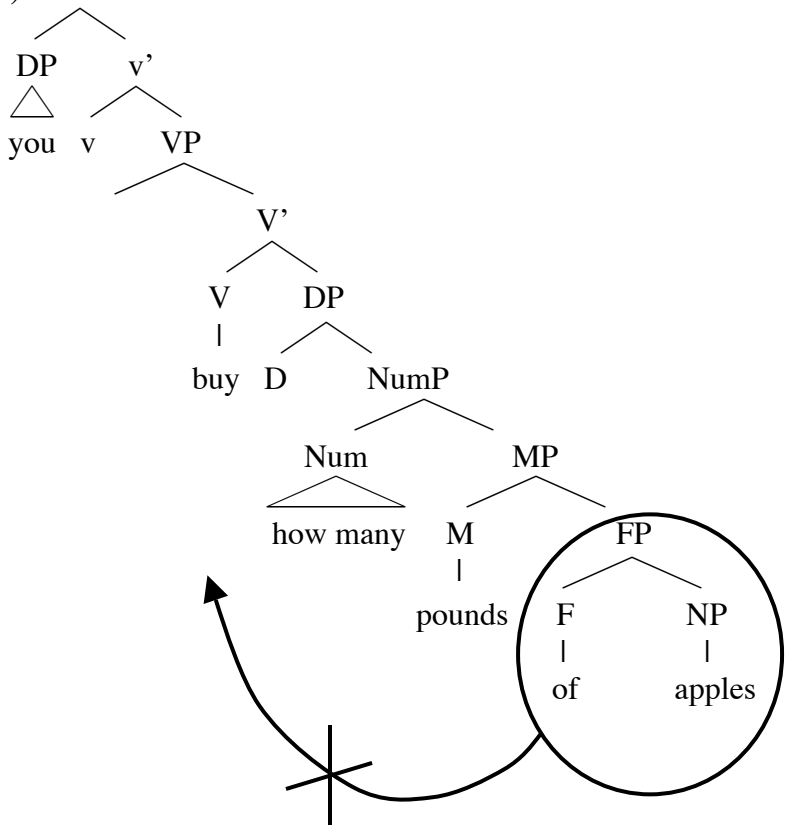
(49) a. <u>How many pounds of apples</u> did you buy?

b. *<u>How many pounds</u> did you buy <u>of apples</u>?

[22] This is does not violate the PIC because spec,DP of the remnant phrase is available for the PP to move through.

The pseudopartitive (49b), on the other hand, cannot take the route shown above for the partitive because "of apples" is not a Prepositional Phrase. The FP cannot move to adjoin to DP (50) because only PPs and CPs can extrapose.

(50) [pseudopartitive]



Because "of apples" cannot extrapose, owing to its non-PP status, it cannot strand when the DP moves to its surface position, and only movement of the *entire* DP [$_{DP}$ how many [pounds of apples]] is allowed.

3.2.3.2 Extraposition of a Modifier

The following sentences are from Stickney 2004 (and Selkirk 1977). They illustrate that the extraposition of a modifier right attached to these constructions is allowed in the pseudopartitive construction (51b), but ungrammatical in the partitive construction (52b).

(51) a. Only a handful of questions concerning electromagnetism were asked.

b. Only a handful of questions were asked concerning electromagnetism.

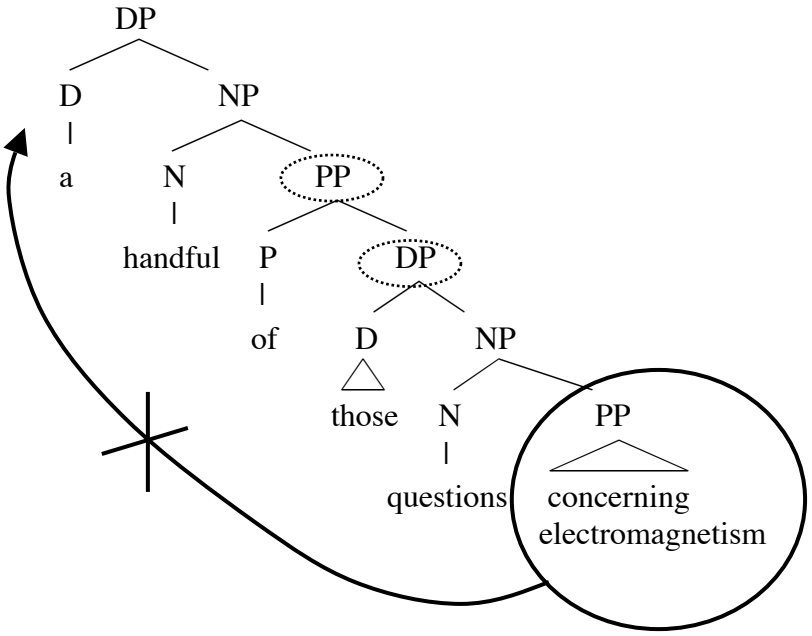
(52) a. Only a handful of those questions concerning electromagnetism were asked.

b. *Only a handful of those questions were asked concerning electromagnetism.

As with the extraposition of the prepositional phrase, the successful extraposition of an attached modifier involves the modifier moving up to adjoin to DP and then the remnant moving from the object of the verb to subject position.

In order for the PP, "concerning electromagnetism" to be stranded it must first move and adjoin to the higher DP [$_{DP}$ a [$_{NP}$ handful ...]]. This movement is blocked.

(53) [partitive]



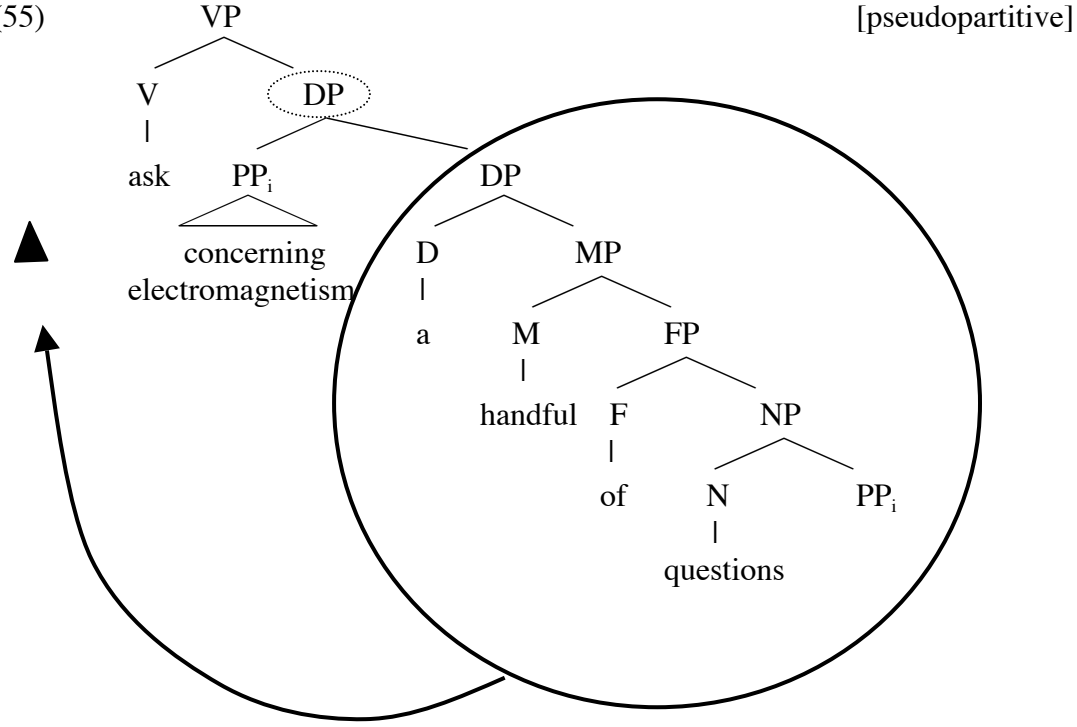
There are two ways of accounting for the fact that the movement in (53) is blocked. We can either follow Campbell 1996 and say there is a specificity operator in spec,DP which blocks movement or we can appeal to Anti-Locality (54).

(54) **Anti-Locality:** Move must cross at least one full phrasal boundary, not just a segment. (Bošković 2005)

Positing a specificity operator in spec,DP prevents the PP "concerning electromagnetism" from moving to adjoin to the DP "a handful of…". Anti-Locality prevents the movement of the PP because both DP and the PP [of [those…]] are phases. The movement of the PP "concerning electromagnetism" must pass through both spec,DP (assuming it is available) and spec,PP. Moving from spec,DP to spec,PP in this case does not constitute crossing at least one full phrasal boundary. Hence, extraposition of a modifier from the partitive is ungrammatical.

Unlike the partitive, right-attached modifiers can extrapose from the pseudopartitive (51). In order to extrapose, the PP "concerning electromagnetism" must first move to adjoin to DP, as we have seen above. Unlike (53), however, it does not have to bypass any phases in order to adjoin to its surface position and allow movement of the remnant DP "a handful of questions" (55).

(55) [pseudopartitive]

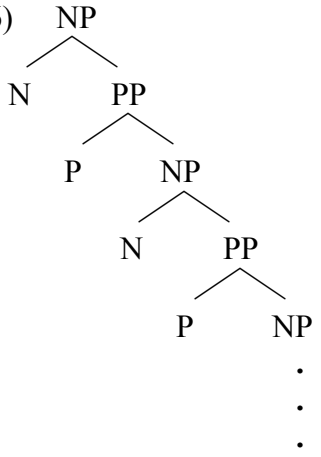


In the derivation of the extraposed pseudopartitive modifier construction (55) there is no DP associated with N2 and no PP housing "of." Thus, there are no barriers to movement. The PP "concerning electromagnetism" first moves to adjoin to DP and then the remnant, [$_{DP}$ a [$_{MP}$ handful [$_{FP}$ of [$_{NP}$ questions [e_i]]]]], moves to its surface position.

3.2.3.3 Recursion

I add here a new piece of evidence to support the claim that the pseudopartitive and the partitive have different syntactic structures: the partitive is recursive, but the pseudopartitive is not. This argument centers on the headedness of the construction. An NP-PP string is infinitely recursive (56), [23] as is the partitive (57).

(56)

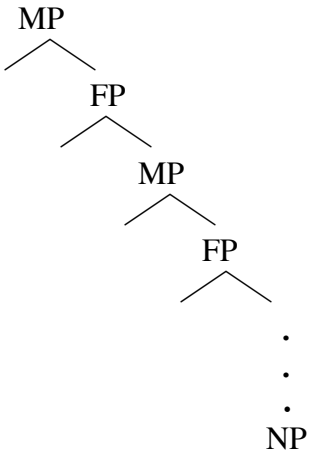


(57) A crate of those boxes of the big red cartons of Bessie's milk.

The partitive is headed by N1. The recursive partitive structure in (56-57) is predicted to be grammatical if the first noun heads the construction —creating an infinite string of complement/modifiers. N1 selects a PP complement, the P in turn selects an NP complement whose head selects a PP complement, etc.. The pseudopartitive, in contrast, is headed by N2. A recursive pseudopartitive would have to retain the final noun as its head, requiring a structure like (58).

[23] The tree in (56) is a simplification. A DP (and all functional projections that intervene between DP and PP) is included in the nominal domain in this recursive structure.

(58)



The structure in (58) does not appear to be possible. I use S-selection as a diagnostic for headedness.

CONTEXT: I restocked the dairy fridge in the cafeteria and then proceeded to get complaints.

(59) Three cartons of milk tasted slightly sour.

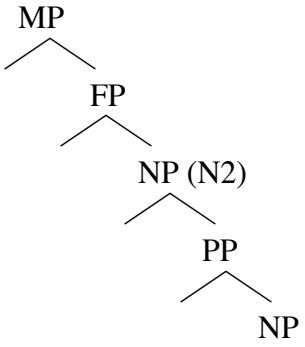
(60) ??Three crates of cartons of milk tasted slightly sour.

In (59) the phrase "three cartons of milk" is a pseudopartitive. It is headed by N2 "milk". The verb "taste" selects "milk" as its theme. In (60) "taste" appears to select "crates" or possibly "cartons" as its theme.[24] This suggests that when we add additional pseudopartitive-like material to a pseudopartitive construction it is not possible to recursively insert the necessary functional projections. I claim that MP and FP are members of an ordered string of functional

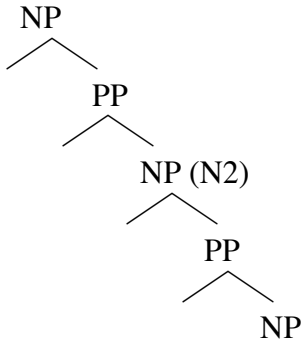
[24] The reader who finds this sentence thematically acceptable may want to try putting the verb in a different place to avoid recency effects. Try instead, "In one sitting, I drank three crates of boxes of cartons of milk."

projections. MP selects FP as its complement. FP selects NP as its complement.[25] The sentences in (59-60) show that if we try to recurse, we get something like the structure in (61): a pseudopartitive with a PP complement, or (62), a standard NP-PP-NP string. In neither case is the final noun the head. In English complex noun phrases, the head is always the first true Noun Phrase.

(61)



(62)



The partitive can infinitely add NPs onto PPs onto NPs. As we can see from the trees in (61) and (62) a true pseudopartitive contains no site for recursion to occur. A string that appears to be a recursive pseudopartitive is, in fact, an alternate syntactic structure (see Chapter 6 (§6.5) for more discussion of an N1-headed pseudopartitive-like string).

3.2.3.4 Summary of Contrasts

[25] It may be possible for MP to select for an NP, if we assume that (a) does not contain some null FP, but it is certainly the case that NP cannot select for FP. It must take a full prepositional complement.

(a) The recipe calls for one cup chocolate.

I have shown that the partitive and the pseudopartitive differ syntactically. The partitive is a bi-phrasal head-complement structure that is headed by N1. The pseudopartitive is a single nominal projection that is headed by N2. I have motivated the use of the pseudopartitive as minimal pair to investigate partitive acquisition. The pseudopartitive has a strikingly different syntax, but only differs from the partitive on the surface by the existence of a definite determiner –whose acquisition is investigated herein. I have given evidence of the difference between partitive and pseudopartitive in a variety of areas. I will now turn to their behavior regarding adjectival modification, the contrast around which this dissertation centers.

3.3 Adjectives

The Measure Phrase in the pseudopartitive is transparent for adjectival modification (63). The parallel noun in the partitive is not (64). In (63), "moldy" can refer to "box", "chocolates" or both.[26] In (64) the adjective can only apply to "box".

(63) a moldy box of chocolates.

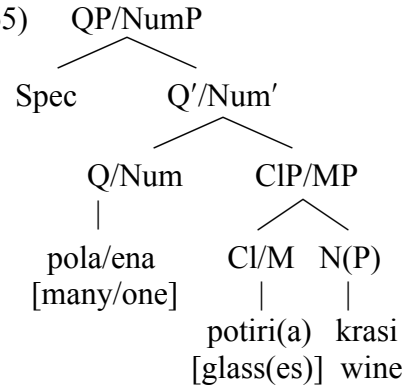
(64) a moldy box of Aunt Margaret's chocolates

[26] However, it is unclear whether an adjective's ability to modify both N1 and N2 at the same time is dictated by the syntax or whether this is just a pragmatic leap that we can easily make. Chris Davis (pc) points out that non-intersective adjectives in combination with the pseudopartitive never get a "both" reading. He points out that a "fake X" is not an X and asks if one is presented with a fake box of fake chocolates whether it can be referred to as "a fake box of chocolates." The answer here is unclear and will need to be adressed in future research on adult processing of the partitive and the pseudopartitive. As will be seen from Chapter 4 on, interpretations in which the adjective appears to modify both N1 and N2 will not be considered as valid data in experimentation due to the lack of clarity regarding what exactly is occurring in the syntax.

An adjective preceding the partitive modifies N1, the head of the construction ("box" in this case). An adjective preceding the pseudopartitive, however, often appears to look through N1 to modify N2. This is true not only of intersective adjectives, such as "moldy," but of subsective adjectives like "skillful" and intensional (non-intersective) adjectives like "former." This paradigm is accounted for by the structures described in this chapter (22 & 23). The pseudopartitive is a single nominal projection. There is only one noun, N2, and this is what is modified by the adjective.

The ability of N1 to be transparent in the pseudopartitive is also accounted for by the structure of Alexiadou Haegeman & Stavrou 2007 (65).[27]

(65)



The structure in (65) is quite similar to the pseudopartitive presented earlier in this chapter. It is headed by N2, and N1 is a Measure Phrase (or Classifier Phrase). On both accounts, the pseudopartitive is a single nominal projection headed by N2. It is N2 that is modified by the adjective by virtue of being the head. Accounts (like Selkirk 1977) that assume that N1 in the pseudopartitive is a noun do not account for why this noun is transparent for adjectival

[27] Alexiadou, Haegeman & Stavrou's structure accounts quite well for Greek pseudopartitives, but does not completely accommodate English pseudopartitives. It lacks a node for the English "of" and also is not dominated by a DP. Alexiadou et al claim that Greek pseudopartitives are not full DPs. They cite evidence that Greek pseudopartitives cannot have a definite determiner, unlike their English counterparts.

modification. As I stated in §3.2, MP is not a noun phrase, but a functional projection. If we assume that the first nominal element in the pseudopartitive is actually a functional head we circumvent the problem of noun-transparency (See Alexiadou, Haegeman & Stavrou 2007 for more discussion). By assuming that "cup" is a Measure we can allow this item to be transparent, assuming that adjectives look for a true NP within the nominal projection to modify, and that Measures don't qualify as nouns.

Like English, the N1 of pseudopartitives in Greek and Dutch is often transparent for adjectival modification (64-65).

(66) Greek:
ena kokino/malako zevghari paputsia
a red/ soft pair shoes

(67) Dutch:
een heerlijk glas wijn
a delicious glass wine

[Alexiadou, Haegeman & Stavrou 2007]

To account for this data, Alexiadou et al claim that ClP/MP is "light in descriptive content" (i.e. more functional than noun-like) and thus able to be "looked through" by a modifier. In fact, Greek Measures often have trouble being modified by an adjective at all.

The structures presented in this chapter (22 & 23) correctly predict that an adjective preceding the partitive will only modify the first noun. These structures also predict that an adjective preceding the pseudopartitive will only modify N2 (68).

(68) A sticky bag of cherries

The phrase in (68) refers to sticky cherries. However, it is easy to imagine that (68) refers to a situation where both bag and cherries are sticky. Alexiadou, Haegeman & Stavrou (forthcoming) suggest that the MP is sufficiently nominal enough to pick up residual properties of the adjective. We can also simply describe this as the Measure Phrase agreeing with the head of the nominal structure. We process the adjective as referring to N1 because N1 in the pseudopartitive is part of the structure headed by N2 and features are shared throughout the nominal projection.

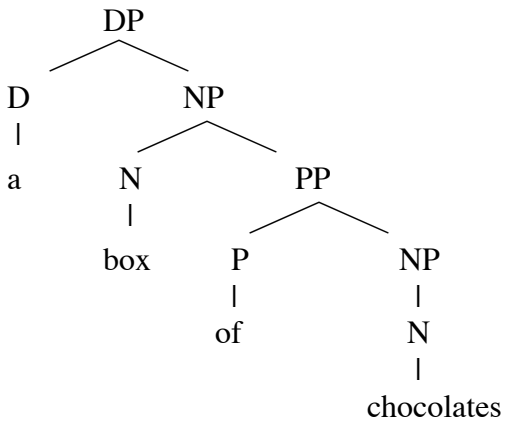
What the pseudopartitive structure in this chapter is lacking, however, is a way to account for those English speakers who can interpret (68) as if just the bag is sticky. If the Measure Phrase is not a noun, then it cannot, alone, receive adjectival modification; it must get it by default from the head of the nominal structure.

Nevertheless in English, it appears that the pseudopartitive N1 alone *can* be modified. For example, in a situation where a novelty candy store sells specialty boxes, it is not infelicitous to ask for (69) and assume that the chocolates are not metal.

(69) A metal box of chocolates

This interpretation of the pseudopartitive cannot be accounted for by the structure proposed in this chapter. We must assume that the pseudopartitive is in fact ambiguous in its structure. It's sister structure is depicted in (70).

(70)



This pseudopartitive structure is headed by N1 and will, for all intents and purposes, behave more like the partitive than the pseudopartitive (the only difference now being the DP layer).[28] For more discussion of this structure and headedness ambiguity see Chapter 6 (§6.3).

3.3.1 Adjectival Movement

As discussed above, the partitive DP creates a barrier to adjectival modification. I assume that adjectives modify what they are adjacent to, but that in certain circumstances they can move and thus modify a noun from a distance. I choose to represent adjectival modification

[28] Note that this is the structure suggested in (62) as what is built when we create a recursive pseudopartitive.

from a distance in terms of movement because it fits with the syntactic literature on adjectives presented in this paper (Laenzlinger 2000 & Bošković 2008). In this section, I will describe how adjectives move using Bošković's (2008) account of adjective movement. I will then apply this account to partitives and pseudopartitives to explain why the determiner in the partitive blocks the adjective that precedes N1 from modifying N2 (71). I will also briefly discuss how the adjective applies to either N1 or N2 (or both) in the pseudopartitive (72).

(71) A spiky_{s} bowl_{s} of Jeremy's rocks_{*s}[29]

(72) A spiky_{s} $\text{bowl}_{(s)}$ of $\text{rocks}_{(s)}$

3.3.1.1 Bošković and Adjectives

Bošković (2008) claims that some languages, such as Serbo-Croatian, lack DP. This lack of DP allows for left branch extraction of adjectives (73) in a way that English disallows (74).

(73) Skupa_{i} je vidio [t_{i} kola] (Serbo-Croatian)
Expensive is seen car
"He saw the expensive car."

(74) *Expensive_{i} he saw [the t_{i} car] (English)

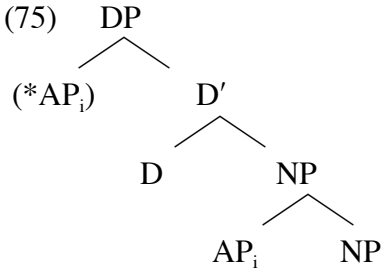
[Bošković 2008]

[29] I use indexes here to show modification, I do not claim any sort of coreference. This is done entirely for ease of explanation.

In (73) the adjective moves out of DP and into spec,CP. In English, movement of an adjective out of DP is highly constrained (Bošković 2008). I assume that English adjectives are not in a fixed position can move within the nominal domain. Many researchers have posited a broad range of adjective positions within DP (to account for adjective movement). So, it is possible that adjectives have a number of places within the nominal projection in which they are generated and/or to which they can move (Cinque 1994, Larson 1998, interalia). Laenzlinger 2000 claims that adjectives originate in a functional position just above NP and move to merge in a semantically relevant position higher in DP (See Chapter 6, §6.2.1 for further discussion of Laenzlinger's structure).

Adjectives are traditionally thought to be generated in an NP-adjoined position.[30] I have just stated above that there are a number of positions where adjectives can appear within the nominal projection, but let's start with the simple structure in (75).

(75)



[30] Bošković claims that in non-DP languages APs are in the specifier of NP. I present all APs in this paper as being adjoined to NP. The difference is not relevant to the distinctions discussed in this dissertation, I leave the disparity to be addressed in future research.

An adjective cannot move out of DP (75) because it is required to pass through spec,DP (Phase Impenetrability Condition) and this type of short movement is banned by Anti-Locality. The PIC and Anti-Locality are repeated below.

(76) **Phase Impenetrability Condition**: In phase α with head H, the domain of H is not accessible to operations outside α, but only H and its edge. (Chomsky 2000)

(77) **Anti-Locality:** Move must cross at least one full phrasal boundary (not just a segment).[31]

In Serbo-Croatian the movement in (73) is possible because DP is lacking. The adjective can make a large enough jump to satisfy Anti-Locality because it is not blocked by the requirements of DP. The adjective in (73) appears in the higher position in the surface structure, but is interpreted at LF in its initial position.

3.3.2 Bošković Applied to Adjective Movement within the Nominal Projection

Bošković's account of adjective movement can account for the adjective's ability to apply freely in the pseudopartitive and its inability to do so in the partitive. Let's look first at the partitive.

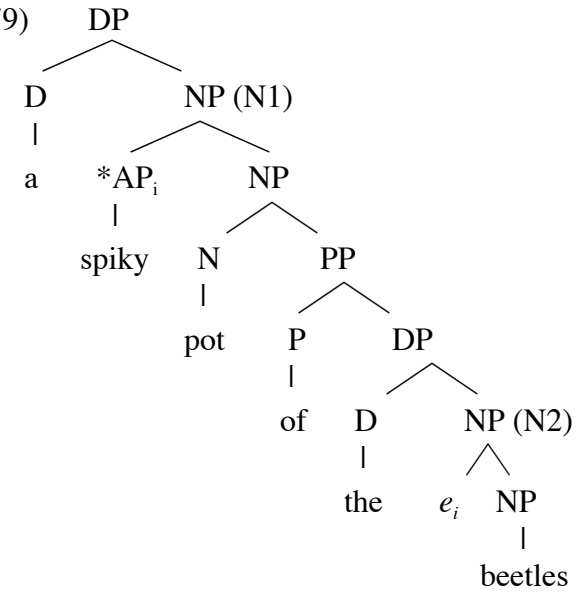
[31] This definition of Anti-Locality may have to be reformulated for a full account of adjective movement. Bošković only represents NP and DP as adjacent to the merged AP. In this paper I propose many nodes that intervene between NP and DP, including MP, QP, etc. In order for anti-locality to be stipulated it would have to include more than just a "full phrasal node", but I will leave the specifics of this to other research and stipulate here only that the move from a position adjoined to NP to the spec of DP is too short.

If the adjective appears before N1 in the English partitive (78), it must be interpreted in its surface position, modifying N1.

(78) A spiky pot of the beetles

In (78) it is not possible to interpret the beetles as being spiky. This is because the adjective cannot have originated as adjoined to N2. The adjective is prevented (by the PIC and Anti-Locality) from moving out of DP (79). It must pass through spec,DP on its way to its position in N1, but it cannot move to spec,DP because the movement is too short.

(79)

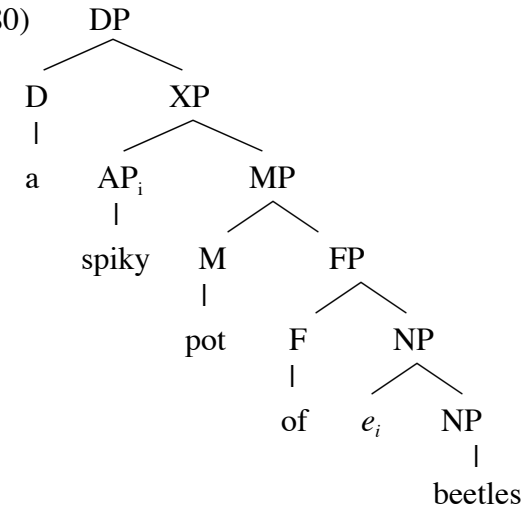


In order to get a partitive with the reading in which the beetles are spiky, the adjective must be positioned adjacent to N2 (80).

(80) A pot of the spiky beetles

The pseudopartitive, on the other hand, has freer adjective interpretation because the adjective is free to move to various parts of the construction due to a lack of DP (80).[32]

(80)



In (80), the adjective originates adjoined to NP, but then is free to move to other adjective positions within the phrase. Once the adjective has moved it can be interpreted at LF in its surface position or in its original position (or both). Thus "a spiky pot of beetles" can refer to a smooth pot with spiky beetles or a spiky pot with spiky beetles.[33]

[32] Depending on how we formulate Anti-Locality (see footnote 30) this movement may also be blocked. However, it is not necessary to say the adjective has moved at all because it is still within the single nominal projection and should be able to modify the head (N2) regardless.

[33] If we allow Backward Raising to be an option, then this model can also account for an interpretation of the pseudopartitive where the adjective modifies only N1. I will address this interpretation more fully in Chapter 6.

3.3.3 Adjective Interpretation as Diagnostic for DP in the Partitive

The difference between partitive and pseudopartitive with respect to adjectives is what I will use as a diagnostic for children's knowledge of DP in the partitive. The other established differences between the two constructions, such as extraposition, provide obstacles to testing with children. For example, extraposition is a complicated concept. Not only is it likely that children learn extraposition much later than they learn complex noun phrases, but it is extremely difficult to design a child-friendly grammatical judgment task that involves extraposition. Thus, a first look at children and the partitive begins here with adjectival modification.

3.3.4 Partitive Acquisition Hypotheses

I repeat here for the reader the hypotheses regarding DP acquisition that were outlined in Chapter 2.

$H0_{dp}$: Children have a fully articulated adult-like DP structure from the beginning (or from the first instance of identifying determiners in the language).

$H1_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. Once they identify DP they project it fully everywhere.

$H2_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. They are aware that determiners can have a variety of features. Until they have fully acquired a construction, they will project minimal DP structure and look for pragmatic cues as evidence for more DP structure.

$H2a_{dp}$: Once children have mastered a range of constructions containing DP in English, they will begin to project a full DP as the default when encountering new constructions. This is the adult grammar/strategy.

$H2b_{dp}$: Regardless of how many DP-containing structures the child encounters, he will continue to project the minimal DP as the default when encountering new constructions. This is the adult grammar/strategy.

These hypotheses will necessarily be a factor in our hypotheses about partitive acquisition in general. If children are not able to properly represent the structure of the Determiner Phrase, they will not be able to correctly represent the partitive structure. The first experiment, discussed in Chapter 4, was designed purely to see if children distinguished between partitive and pseudopartitive. I now present some simple hypotheses about children's representation of the partitive and its relation to adjectival modification.

H_p0: English-speaking children's partitives are target-like from the beginning, creating a barrier to adjectival modification of N2.

H_p1: English-speaking children's partitives are not target-like and young children use simple combinatorial processes when faced with complex noun phrases. These combinatorial processes will combine the adjective with the closest noun-like element, regardless of construction type.

H_p2: English-speaking children's partitives are not target-like and young children start out projecting partitives that lack a barrier feature.

The DP Hypotheses and the partitive hypotheses have some overlap. $H0_{dp}$ and H_p0 have the same predictions for acquisition. Children will only modify N1 in the partitive and will be free to modify N1 or N2 in the pseudopartitive. $H1_{dp}$ and $H2_{dp}$ (including its two sub-versions) would have similar predictions to H_p2. H_p1 has nothing to do with the Determiner Phrase and instead is an interpretational strategy. Table 3.1 presents the predictions of the partitive hypotheses (and overlapping DP hypotheses) for adjectival modification.

	Partitive		**Pseudopartitive**	
	Modify N1	**Modify N2**	**Modify N1**	**Modify N2**
H_p0 / $H0_{dp}$ (adult)	Y	N	Y	Y
H_p1	Y	N	Y	N
H_p2 / $H2_{dp}$	Y	Y	Y	Y

Table 3.1: Predictions for Basic Hypotheses

A table does not easily describe H2adp and H2bdp. They address a broader view of children's acquisition of DP longitudinally and across constructions. They are not relevant for the initial experimental predictions, but will be very relevant to the final analysis of data. I will return to them in Chapter 6.

I will now present four experiments that seek to see if children know the difference between partitive and pseudopartitive in terms of adjectival modification. The first experiment seeks simply to see if children distinguish between the two constructions. It shows that they do not.

The following three experiments look more closely at DP and whether this is the source of children's partitive acquisition problems.

CHAPTER 4

PILOT EXPERIMENT: PARTITIVE VS. PSEUDOPARTITIVE

This pilot experiment uses adjectival modification as a diagnostic to ask if children distinguish between partitive and pseudopartitive. I will present the experiment and the data and show that children do not distinguish between partitive and pseudopartitive in the area of adjectival modification. This experiment leaves a number of questions open. It is not clear whether children's inability to distinguish between the two structures is due to their syntactic structure for the partitive or whether it is due to their inability to correctly project the structure of DP. I will discuss the results and then motivate the three follow-up experiments.

4.1 The Pilot Experiment

4.1.1 Subjects

The subjects were 42 normally developing children aged 2;11 - 6;2 (mean age 4;11) and 12 adult controls (undergraduate students at the University of Massachusetts, Amherst).

4.1.2 Procedure

The contrast between partitive and pseudopartitive (with respect to adjectival modification) had never been tested experimentally before. Thus it was necessary to find a contrast that was

clear for adults. To this end, the experiment contained three different types of tasks, an act out task, a coloring task and a story comprehension task, and it was assumed that any particular task that did not provide a clear contrast would be excluded from the final analysis. It also became clear during the design phase of this experiment that particular adjectives seem to be able to pragmatically cross barriers.

For example, consider temperatures. A temperature combined with a pseudopartitive almost seems idiomatic (1-3).

(1) A hot cup of tea

(2) A cold cup of coffee

(3) A warm bowl of soup

We do not question whether the temperature refers to container or liquid. It seems clear that the temperature refers to the liquid and that the container, when we think of it, must be the same temperature by default.

If these pseudopartitives are turned into corresponding partitives (4-6), it seems that our world knowledge (or pragmatics) carries over.

(4) A hot cup of that tea

(5) A cold cup of his coffee

(6) A warm bowl of grandma's soup

Although we may sense that the adjectives in (4-6) are only applying to N1, we may very naturally allow it to apply to the entirety of the construction (i.e. to modify N2).[34] For this reason, adjectives were chosen which seemed, to the author, to best conform to the partitive/pseudopartitive parameters; however it was clear that these adjectives would need to be tested experimentally with adults as well as children.

In order to compare partitive and pseudopartitive, items had to be chosen that differed only with respect to the definite determiner. Pseudopartitives tend to contain measure phrases that refer to containers (7a) or collections (7b) (Koptjevskaja-Tamm 2001).

(7) a. a carton of milk

b. a herd of elephants

This property of pseudopartitives necessarily excluded the study of partitives containing quantifiers (8a) or numbers (8b) because there are no pseudopartitive counterparts (9).[35]

(8) a. most of the milk

b. three of the elephants

[34] I claim that the ability to modify N2 in these cases is due to pragmatic influence, but clearly the syntax should also be able to account for this possibility. See Chapter 6 for discussion of ambiguity in the partitive structure.

[35] It has been argued recently (cf. Schwarzschild 2006) that phrases like "most milk" and "three bears" do indeed have the same internal structure as the pseudopartitive, but this will not be discussed further here.

(9) a. *most of milk

b. *three of bears

Additionally, partitives and pseudopartitives were chosen whose N1 and N2 could be modified by similar adjectives. Hence, all items in the experiment contained some sort of container (N1) and some sort of substance (or large amount of small items) (N2).

Below are examples of each type of task. Each experimental item began with a story and was followed by a partitive or a pseudopartitive prompt (preceded by an adjective). The children received one of two versions of this experiment containing seven experimental items (2 act out, 2 coloring, and 3 story comprehension). The two versions were counterbalanced so that items that were partitive in one version were pseudopartitive in the other. Thus, each child either got three partitives and four pseudopartitives or four partitives and three pseudopartitives.[36] The stories were identical for prompt type (partitive or pseudopartitive). Each story contained wording that made the definite determiner in the partitive items felicitous. All partitive prompts contained the definite determiner "the."

4.1.2.1 Act Out

The act out tasks required the child to put substances into containers. For the particular property of the adjective to be presented there were substances and containers that matched

[36] After the experiment was run it was determined that one of the act out tasks did not give useful results (see §4.3). The results were analyzed without this item, leaving each subject with three partitive and three pseudopartitive prompts.

that property and ones that didn't. For example, in one item the child was presented with beads and pots. Half of the beads were sparkly and half were not. One of the pots was sparkly and two of the pots were not sparkly. The child was prompted to put beads in a pot so that we'd have a:

(10) a. sparkly pot of beads [pseudopartitive]

b. sparkly pot of the beads [partitive]

If the child was given a pseudopartitive prompt, either the pot (container) or the beads (substance) could be sparkly. If the child was given a partitive prompt and he had an adult-like partitive structure, then he would only allow the pot to be sparkly and not the beads.

4.1.2.2 Coloring

In the coloring task, the child was presented with a picture of a container filled with a substance and the child was instructed to color the picture. Each act out prompt contained an adjective followed by a partitive or pseudopartitive "can you make this an ADJ N of (the) N?" In one item the child was showed how to put "prickers" on a cactus with a stamp marker and then was presented with a picture of a plate with cookies on it. She was then asked to make:

(11) a. a prickly plate of cookies [pseudopartitive]

b. a prickly plate of the cookies [partitive]

If the child was given a pseudopartitive prompt, then coloring either the plate (container) or the cookies (substance) was acceptable. If the child was given a partitive prompt, then only the plate would be available for coloring if she knew that the partitive contains an internal barrier to adjectival modification.

4.1.2.3 Story Comprehension

The story comprehension items required the child to either choose a picture or answer a yes/no question. Again, the child was presented with either a partitive or pseudopartitive prompt. His answers would differ depending on whether he allowed the adjective preceding the structure to modify N2 (the substance). In one item the child was told a story about a witch who has a special chicken soup recipe that she always uses. She makes the soup and then does different things with it. The child was presented with four pictures: an old pot with new soup in it, a new pot with old soup in it, and two foils. The child was then prompted to hand the witch each picture. The relevant prompt asked the child to hand the witch either (12a) or (12b).

(12) a. an old pot of soup [pseudopartitive]

b. an old pot of the soup [partitive]

The key diagnostic for barriers in all of the above cases is whether the child allows the adjective to modify N2 (the substance) in the partitive. This should be disallowed if the child recognizes that the partitive is bi-phrasal and contains a barrier to adjectival modification. In other words, a child who projects an adult-like partitive structure should allow an adjective to modify either container or substance for the pseudopartitive, but should *disallow* the adjective to modify the substance when faced with a partitive construction.

4.2 Hypotheses & Predictions

I return here to the hypotheses outlined at the end of Chapter 3. Table 4.1 sums up the various predictions made by these hypotheses.

	Partitive items		**Pseudopartitive Items**	
Hypotheses	**Container (N1)**	**Substance (N2)**	**Container (N1)**	**Substance (N2)**
H_p0 / $H0_{dp}$ (adult)	Y	N	Y	Y
H_p1	Y	N	Y	N
H_p2 / $H2_{dp}$	Y	Y	Y	Y

Table 4.1: Predictions of Availability of Adjectival Modification Based on Prompt Type.

4.3 Results

As mentioned in §4.1, there were no precedents for experimentally testing the interaction of adjectives with the partitive and the pseudopartitive and three types of task were used to investigate this contrast. There was no significant difference between subjects' performance on the various task types, so the results for each task are collapsed in the data below.

One difficulty arose for the coding of the results. It became clear that interpretation of a "both" response, when given for a partitive prompt, was difficult to code. If the subject allowed the adjective to modify both N1 and N2 did he ignore the barrier in the partitive and allow N2 to be modified? Or did he recognize that the adjective referred only to the container (N1), but let the adjective modify the substance for some other reason (say, matching/aesthetics for instance). For this reason, all "both" responses were removed from the data analysis. The majority of "both" responses were on pseudopartitive items, so this removal did not skew the data toward any of the predictions in Table 4.1. One act out item *did* elicit a large proportion of "both" responses and was removed from the data analysis.[37] Table 4.2 shows the percentages of adjectival modification for each construction for each age. These results are based on 324 responses to six experimental items.

[37] This act out item required the subject to put colored pompoms into colored boxes. Both adults and children had a tendency to match the color for container and substance.

Age	Partitive items		Pseudopartitive Items	
	N1	N2	N1	N2
3 (n = 9)	42.86%	57.14%	31.82%	68.18%
4 (n = 12)	51.43%	48.57%	29.03%	70.97%
5 (n = 11)	46.67%	53.33%	38.71%	61.29%
6 (n = 10)	62.96%	37.03%	34.48%	65.51%
Adult (n = 12)	75.00%	25.00%	50.00%	50.00%

Table 4.2: Percentage of Substance and Container Responses for Each Prompt Type.

Subjects were analyzed based on individual age groups and there was no significant difference between the performances of the three, four and five year olds. These responses were collapsed for the analysis below.

The crucial responses for all hypotheses are the substance responses. All age groups gave more substance than container responses for the pseudopartitive. Only the 6 year olds and the adults clearly preferred container responses to substance responses in the partitive. Figure 4.1 shows the percentage of times subjects interpreted container (N1) or substance (N2) to be modified by the adjective in partitive items.

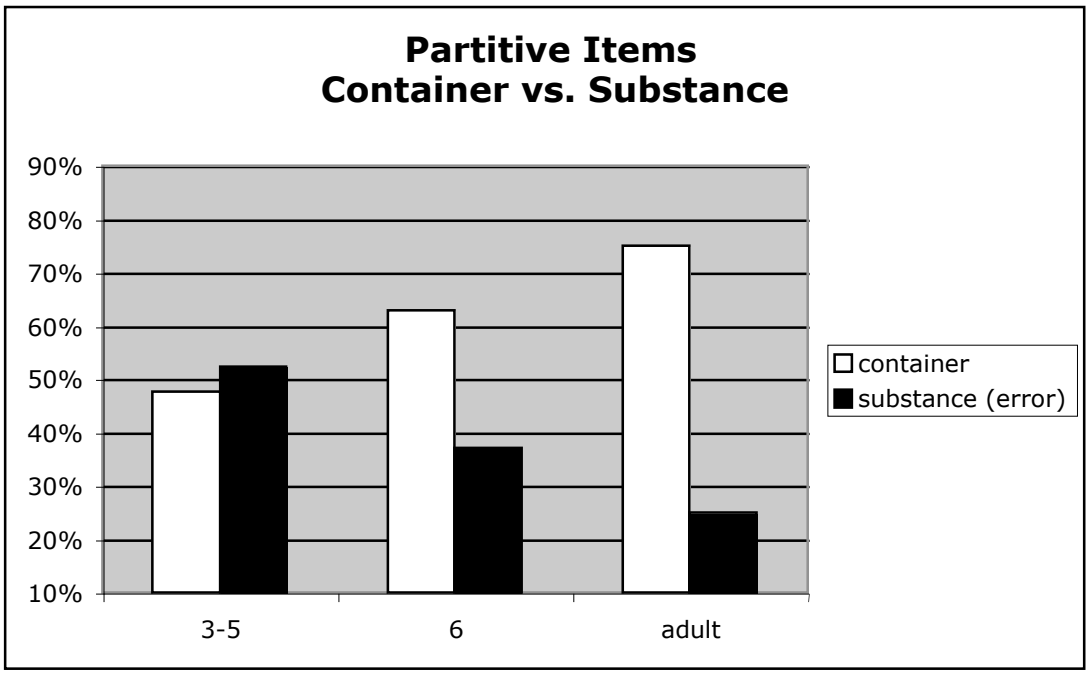


Figure 4.1: Percentage of Response Types per Age Group for Partitive Items.

The proportion of partitive errors was analyzed with a univariate ANOVA, with the average number of partitive errors at three levels of age (3-5, 6 & adult). The dependent variable was the proportion of partitive errors. There was a main effect of age ($F(2,53) = 3.673$, $p = .032$). A pairwise comparison showed significance between the partitive error scores of adults and 3-5 year olds at $p = .013$.

The proportion of times subjects allowed N2 to be analyzed, the substance score, was then analyzed (Figure 4.2).

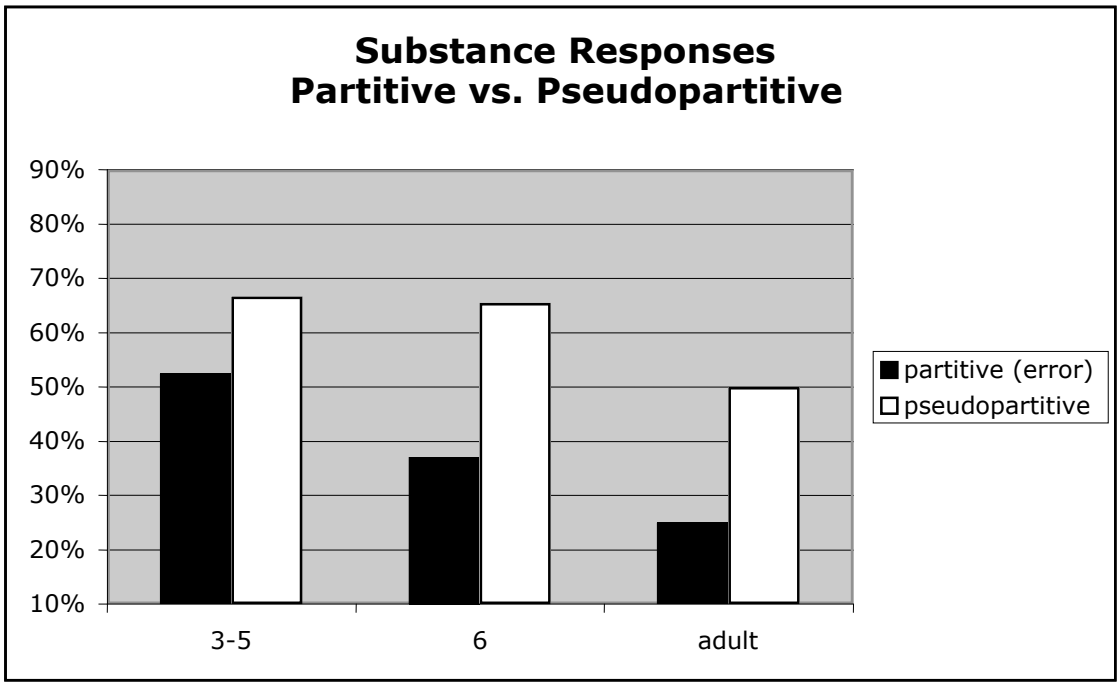


Figure 4.2: Substance Responses for Partitive and Pseudopartitive by Age Group.

The proportion of substance responses were analyzed with a 2X3 mixed ANOVA, with the average numbers of substance answers at two levels of prompt type (pseudopartitive and partitive) and three levels of age (3-5, 6 & adult). The dependent variable was the proportion of substance responses. There was a main effect of prompt type ($F(1,51) = 16.609$, $p = .000$) and a main effect of age ($F(2,51) = 3.278$, $p = .046$). There was not a significant interaction between age and prompt type ($F(2,51) = 1.036$, $p = .362$). However, looking at the effects of prompt type for each age group individually reveals that adults differentiate significantly ($F(1,11) = 7.05$, $p = .02$) and so do the six year olds ($F(1,9) = 9.256$, $p = .014$).

Returning to the predictions in §4.2, the results are consistent with H_p2. In contrast to the adults, who make a clear distinction between partitive and pseudopartitive, children aged 3-5 are not respecting the barrier to adjectival modification that is present in the partitive.

H_p1, which proposed a pragmatic strategy where children would modify the item closest to the adjective –treating both partitives and pseudopartitives alike, is not supported. All children preferred to modify N2 in the pseudopartitive. Additionally 3-5 years olds showed no significant preference for modifying the first noun in the partitive. This also rules out H_p0, which predicted that children would modify the first noun in the partitive and be free to modify either nominal element in the pseudopartitive.

The results show us that children aged 3-5 are not respecting the barrier in the partitive that prevents the adjective from modifying N2.

4.4 Discussion

Despite the promising results from this experiment, showing us that children are not respecting a barrier in the partitive that is respected by adults, there are remaining questions about the partitive that prevent a strong claim regarding the acquisition of DP. The first question regards whether children are recognizing barriers at all. Do children ever consistently recognize barriers in complex noun phrases? The second question is whether children have difficulty recognizing *all* DPs as barriers or just "the." Further questions

brought up by this research include (a) what structure children build when they misrepresent the partitive? (b) what triggers children to decide that DP is a barrier? And finally (c) why were 25% of the adult responses "non-adult" according to the predictions?

4.4.1 Barriers in Complex Noun Phrases

One way of accounting for the data in the pilot experiment is to say that children always interpret the second noun of a complex noun phrase as the head, and hence they don't differentiate between partitive and pseudopartitive because, essentially, for them there is no difference.

Another way to address this is to say that children recognize that the partitive and the pseudopartitive are different structures, but they are yet unable to reliably project the node containing the barrier feature. In other words, children are just simply bad at recognizing barriers. One way to address this is to compare the head-complement structure with a prepositional adjunct structure like (13b).

(13) a. a lumpy bowl of oatmeal

b. a lumpy bowl with oatmeal

Because "with oatmeal" (13b) is an adjunct, "bowl" is clearly the head and the adjective "lumpy" cannot modify "oatmeal." If children are successful in recognizing this contrast, then there is evidence that DP is indeed the source of the problem seen in this study.

4.4.2 All DPs or Just "The"?

The Pilot Experiment used only "the" as the definite determiner in the partitive. This leads one to ask whether the source of the barrier problem is with the lexical item "the", rather than all DPs in general. Is it the case that children fail to treat *all* DPs as barriers or is each type of determiner recognized as a barrier at different times in the acquisition process? The majority of the literature on the acquisition of both the syntax and semantics of DP focuses on "the" (Maratsos 1976, Otsu 1981, Coles 1998, Matthewson, Bryant & Roeper 2001, Roeper 2006, Wexler in press, interalia). Kupisch 2006 suggests that the acquisition path and timing for the definite determiner in any given language depends on the amount and kind of semantic information encoded on it. It may be the case that for each type of DP this knowledge must be acquired –and that each determiner has its own rate of acquisition.

If so, it is probable that "the" is one of the last determiners to be recognized as a barrier. As discussed in §2.2.2, de Villiers & Roeper (1995) discuss children's difficulty with DP. They look at light verb constructions such as "make the decision" in which the determiner is *not* a barrier to extraction (13).

(14) a. How$_i$ did the boy make the decision to play t_i?

b. *How$_i$ did the boy like the decision to play t_i?

[de Villiers & Roeper 1995, 82:25]

de Villiers & Roeper claim that in adult English the "the" in "make the decision" is located in spec,NP and that no DP is projected to create a barrier to movement. They show that children's grammars treat "like the decision" like "make the decision," allowing "how" to be extracted across a barrier.

The fact that for adults the "the" in "make the decision" does not create a barrier presents an interesting point: English "the" is ambiguous in what features it contains. If children notice this, it may take them longer to treat "the" as a barrier, even though they may recognize that other DPs are barriers. An ambiguous "the" may also be the cause of the 25% error rate in adults on the partitive items. If "the" is ambiguous in what features it contains, it may be possible that for some adults "the" occasionally loses its barrier feature. I will return to this topic in Chapter 6.

Whether some property of "the" is responsible for the above results can be investigated experimentally by simply contrasting the type of determiner used in the partitive (15).

(15) a. an old pot of the soup

b. an old pot of Jane's/his/that soup

If "the" is indeed treated differently by children (or adults), then the contrast in (15) should show it.

4.4.3 Children's Partitive Structure

Another issue in need of further investigation is the question of just what sort of partitive children are constructing if they don't have a complete Determiner Phrase. One possibility is that children are building a partitive construction that is identical to the adult construction, except for the fact that DP lacks particular features, including the one that makes DP a barrier. Another possibility is that children, lacking the DP barrier feature, are building a pseudopartitive. Rutkowski (2007) suggests that pseudopartitives, diachronically, are syntactically reduced partitives. It may be that initially, due to the same principles of economy that govern language change, the pseudopartitive is an easier structure for children to project. A third possibility is that children are building a partitive that contains only NPs.[38] Each of these options would be consistent with the results of the current experiment, but have further implications that can be tested experimentally. For example, a partitive containing only NPs would lack semantic features such as referentiality, but would have the same

[38] If, as I stated in Chapter 3, PPs are phases (Sabbagh 2004), then we might expect that the partitive would still block adjectival modification even if DP was lacking. In that case, we would have to assume that a reduced partitive of this sort contained FP rather than PP. It still would differ from the pseudopartitive, however in terms of headedness. See Chapter 6 for more discussion of this topic.

extraposition properties as the partitive, which differ from the pseudopartitive. Testing all of these options experimentally is beyond the scope of this dissertation. I will discuss them further, however, in Chapter 6.

4.5 Further Experimentation

It is clear that the Pilot Experiment presents a number of problems and a number of questions. First, the Pilot Experiment used three different methodologies. A definite claim about children's ability to differentiate between partitive and pseudopartitive needs to not rely on the collapsed results of three different task types. There were no significant differences between the task types –except that the coloring and act-out tasks allowed for a "both" response (e.g. both N1 and N2 are modified). "Both" answers are not easily interpretable. A child who chooses to apply the adjective to both N1 and N2 in the partitive can be said to be violating the barrier by modifying the N2, but in certain cases he might be doing something extra-linguistic, like "oh, I made the box red, like I'm supposed to, but here are all of these nice red pompoms, I'll just make them match to be consistent." Whether or not this second option is plausible, there is no real way to rule it out if a "both" response is allowed in response to the target phrases.

The Pilot Experiment also raises a number of questions. The first among them is the question of whether this experiment, if its results are valid, is an example of a failure of DP or just a failure of "the." This experiment claimed to contrast partitive and pseudopartitive, but only

used partitives containing "the" as the internal DP. Hence, although the experiment shows us that children's partitives are deficient in some way it doesn't tell us whether they are deficient because they are lacking a barrier, whether they have the wrong structure, whether they have a deficient DP, whether something else creates the barrier which is deficient here or whether there's just something about "the" that makes the partitive transparent for adjectival modification.

First and foremost, it is important that the follow-up experiments show that the error rate in the partitive is not just due to methodology. This was mostly ruled out because the 25% error rate for adults was not linked to one particular item or task type. Additionally, after one item was removed from the data[39], the 25% error rate remained. The first experiment in Chapter 5 is a refined version of The Pilot Experiment. It uses a picture choice task (which was the most consistently successful of the methodologies in the pilot). The pictures from which the child must choose do not allow for a "both" interpretation, making the data easier to code. Chapter 5 also covers two other experiments, one that looks at acquisition of barriers in complex noun phrases in general and one that looks at a range of DPs in the partitive structure.

[39] This item asked subjects to put colored balls in colored boxes. Subjects matched the colors regardless of whether they heard a partitive or a pseudopartitive prompt.

CHAPTER 5

THREE EXPERIMENTS

The pilot experiment leaves a number of questions open. Three follow-up experiments were designed to further explore these questions and to tighten the experimental design. The experiments were designed to investigate the following questions. Do the results for children and adults hold with one consistent experimental design (§5.2)? Do children *ever* represent barriers in complex noun phrases (§5.3)? Is the determiner "the" the root of the barrier problem in the partitive, or do children (and some adults) treat all DPs as if they lacked a barrier (§5.5)?

All three experiments were based on the same within-subjects design. All three experiments used the same materials, but had different target sentences ((2-7) below). The design was a picture choice task. Each subject was presented with ten stories. At the end of each story they were presented with a target phrase and were asked to choose which of three pictures the phrase referred to. Each subject was given 8 target phrases and two controls. Each experiment had only two contrasting target sentence types (from the six types listed below). Each subject heard four of each contrasting target sentence (except for the DP Experiment, which will be discussed in more detail in §5.3). Each experiment had two versions (version a & b) –the pictures remained the same for each version, but the type of target sentence was switched to balance the two types of item being contrasted. Items within each version were randomly ordered each time the experiment was run. For all three experiments, regardless of version, subjects were presented with the same ten stories (Appendix B) and the same

pictures, only the target phrase changed. For example, in one item the subject was told a story about a mom who worked at the circus and baked cookies for all the circus performers.

(1) **"**This mom lives at the circus. She likes to bake cookies for all of the circus performers. All of the people at the circus love the mom's cookies --especially the seals… they'll eat *anything*! One day the mom, made lots and lots of cookies. She put them on plates. As the mom was cleaning up after baking, three clowns and a seal came into the kitchen. The clowns started to dance and throw things! Uh-oh! Something's going to get broken! Lots of stuff broke, but the clowns were nice enough to try to pick things up. [child presented with picture containing: (a) an unbroken plate with unbroken cookies; (b) an unbroken plate with broken cookies; (c) a broken plate with unbroken cookies on top (Fig. 5.1)]. The mom was a little sad. She was worried that no one would want to eat anything now. Except remember, seals eat *everything* --they don't care what it looks like. And guess what? The seal wanted something! …"

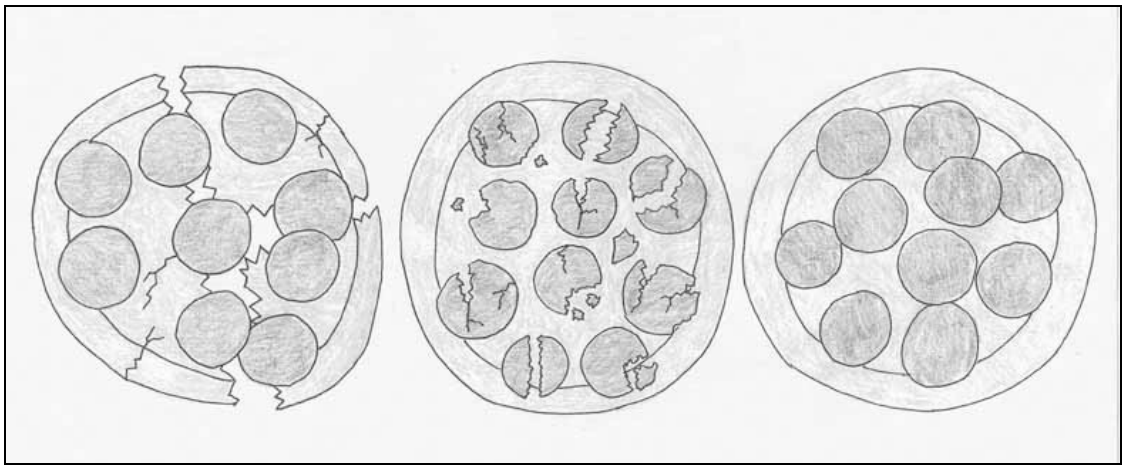


Figure 5.1: Picture Choice Example for the Three Follow-up Experiments.

All subjects heard this story, at the end of the story they were presented with a phrase describing what the seal wanted and a picture choice (Fig. 5.1). All subjects saw the same

picture. Depending on the experiment, the phrases that the subjects heard at this point in the story differed. After the experimenter introduced the phrase, a puppet, who had also been listening to the story, would repeat the phrase and ask the child to clarify which item in the picture was described.

Throughout each story, subjects were asked intermittent questions by both the experimenter and the puppet to check that they were paying attention to the story or to keep them generally engaged.

The first experiment, the "The" Experiment (§5.1), was designed to replicate the results of the pilot experiment with a cleaner experimental design. Do children distinguish between the partitive and the pseudopartitive if the partitive item contains "the" as its intermediate determiner? Subjects in this experiment heard either a partitive prompt (2) or a pseudopartitive prompt (3).

(2) The seal wanted a broken plate of the cookies.

(3) The seal wanted a broken plate of cookies.

The second experiment, the "With" Experiment (§5.2), investigates whether children recognize a barrier to adjectival modification in complex noun phrases with prepositional adjuncts. This experiment investigated whether children are able to identify barriers to adjectival modification at all. Subjects were presented with pseudopartitive items (3) and nouns with a prepositional adjunct containing "with" (4).

(4) The seal wanted a broken plate with cookies.

The third experiment, the DP Experiment (§5.4), investigates whether children are more likely to identify particular items as projecting a DP than other items. This experiment contrasted partitives containing "the" (2) with partitives containing demonstratives (5), possessive pronouns (6) and full possessive phrases (7).

(5) The seal wanted a broken plate of those cookies.

(6) The seal wanted a broken plate of her cookies.

(7) The seal wanted a broken plate of the mom's cookies.

Each experiment was run on children aged 3-6 and adults, with roughly five children in each age group and ten adults. Each subject saw only one version of the experiment. For discussion of the results, the children are grouped into younger (3-4) and older (5-6). Collapsing all experiments, there were 108 subjects. These subjects were comprised of 12 3-yr-olds, 17 4-yr-olds, 16 5-yr-olds, 11 6-yr-olds and 54 adults.

5.1 The "The" Experiment

The "The" Experiment, like all three experiments in this chapter, uses the methodology and materials described at the beginning of this chapter. This experiment contrasted partitive

phrases containing "the" with pseudopartitive phrases. It was designed to see whether the results from the Pilot Experiment would hold under cleaner experimental circumstances. Do children treat the partitive containing "the" as if it were the pseudopartitive? Does some proportion of the adults do this, too? Subjects were given partitive items containing "the" (2) and pseudopartitive items (3) both preceded by an adjective.

(2) The seal wanted a broken plate of the cookies

(3) The seal wanted a broken plate of cookies

The picture choice allowed them to choose between a case in which the adjective modified N1 (the plate is broken) and a case in which the adjective modified N2 (the cookies are broken). The third picture choice was a foil where nothing was broken. If the subject recognizes that "the" is a full DP, he should project it as a barrier to adjective movement, and, hence the only possible interpretation is one in which the adjective modifies N1 because that's where it appears in surface structure. If a subject does not recognize that "the" is a full DP, then there will be no barrier to adjectival movement and he should allow the adjective to modify in either position. The pseudopartitive does not contain an internal DP, so the adjective is free to modify either N1 or N2.

There were two versions of this experiment, in complementary distribution. The stories are numbered 1-10 for convenience of reference (Appendix B), but the stories were randomly ordered for each subject. In one version, the odd items were partitive-"the" items and the even items were pseudopartitive items (version a). In the other version, the odd items were

pseudopartitive items and the even items were partitive-"the" items (version b). This controlled for any effect of story/picture on the interpretation of partitive-pseudopartitive contrast. Subjects heard the items in random order.

In this experiment as with all others containing these materials, each item contained a story that ended in a picture choice. The stories provided enough context to make the use of a definite item felicitous, but the picture choice was set up such that the use of a non-definite phrase to elicit a picture choice was also felicitous. In the "The" Experiment, as with the other two experiments subjects heard 8 experimental items and two controls. For each subject, two of the ten stories were chosen at random to be control items. The control items had the adjective in a position preceding N2 (8).

(8) The seal wanted a plate of broken cookies.

5.1.1 Predictions

Returning to the hypotheses at the end of Chapter 3, the predictions in this experiment are the same as for The Pilot Experiment.

	Partitive		**Pseudopartitive**	
	Modify N1	**Modify N2**	**Modify N1**	**Modify N2**
H_p0 / $H0_{dp}$ (adult)	Y	N	Y	Y
H_p1	Y	N	Y	N
H_p2 / $H2_{dp}$	Y	Y	Y	Y

Table 5.1: Predictions for the "The" Experiment

If children have the adult grammar, they will modify only N1 in the partitive, but either in the pseudopartitive. If they use a pragmatic strategy of modifying the closest nominal item available for modification, then they will only modify N1 in both constructions. If they do not perceive the determiner "the" to project a full DP, then they will treat partitive and pseudopartitive alike, allowing N1 or N2 to be modified. All subjects should only modify N2 in the control items.

5.1.2 Subjects

There were 33 subjects. There were eleven subjects in the younger group (four 3-yr-olds, seven 4-yr-olds) with a mean age of 3;11. There were eight subjects in the older group (seven 5-yr-olds, one 6-yr-old) with a mean age of 5;7, and fourteen adults. In the younger group, five subjects saw version a and six subjects saw version b. In the older group four saw version a and four saw version b. Of the adults, six saw version a and eight saw version b.

5.1.3 Results

Table 5.2 and shows the percentage of responses in which subjects allowed N2 to be modified for each prompt type. I focus on N2 because it is roughly in complementary distribution with the N1 responses[40] and because N2 should be the only answer for the controls and an error for the partitive items.

[40] Twelve subjects volunteered "both" responses, claiming that either N1 or N2 could be modified. Of those subjects, seven gave a "both" response for the partitive. This group was comprised of three 4 year olds, one 6

Age	Control	Partitive "the"	Pseudopartitive
Young: 3-4	77.27%	29.55%	34.88%
Older: 5-6	81.25%	25.00%	34.38%
adult	96.43%	14.29%	26.79%

Table 5.2: Percentage of Times Each Age Group Allowed N2 to be Modified

Figure 5.1 contrasts the percentage of responses (broken down by age group) that allow N2 to be modified in partitive items with the percentage of responses allowing N2 to be modified in pseudopartitive items.

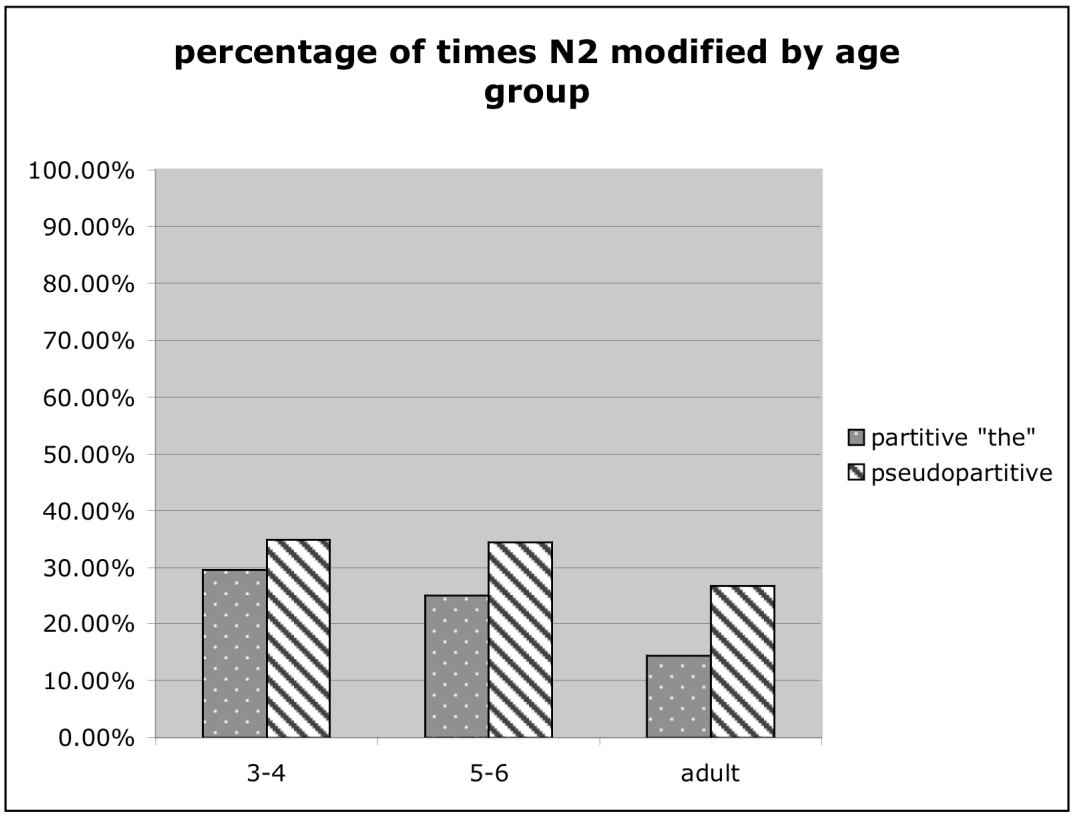


Figure 5.2: Percentage of times N2 was modified

A repeated measures ANOVA with partitive score versus pseudopartitive score as dependent variables and age group as the independent variable was run on this data. There was no

year old and three adults. All but two gave only one "both" response across the four partitive items they heard. "Both" responses were coded as both N1 and as N2 in the data.

significant difference between performance on partitive and pseudopartitive as a whole ($F(1,30) = 2.711$, $p = .11$). There was no interaction between age group and ability to differentiate ($F(2,30) = .218$, $p = .805$). There was no significant difference between the age groups. All groups are trending in the right direction, more likely to modify N2 in the pseudopartitive than the partitive.

A Univariate ANOVA was run on this data with the partitive score as the dependent variable and adult vs. child as the independent variable. Adults and children as a group, do not significantly differ on how they treat the partitive "the" items ($F(1,32) = 1.728$, $p = .198$).

This data suggest that children do not clearly distinguish between partitive-"the" and pseudopartitive items. Adults do not distinguish, either, although they are approaching significance ($F(1,13) = 2.116$, $p = .169$). The lack of significance may be partially due to the fact that 21% of adults never modify N2 on the target items, regardless of whether those items are partitive or pseudopartitive (Table 5.3).

Age	**Modify both N1 & N2**	**Never modify N2**	**Both N1 & N2 modified equally often**
3-4	55%	18%	36%
5-6	50%	13%	13%
adult	14%	21%	29%

Table 5.3: Further Breakdown of Scores on the "The" Experiment: Percentage of Subjects who Showed Various Modification Patterns.

Table 5.3 shows the modification patterns for the age groups on both partitive and pseudopartitive items together. If we remove those subjects who never modified N2 we can see the same pattern emerging that was evident in Figure 5.1 (Table 5.4).

Age	N2 modified more often on pseudo items	N2 modified more often on "the" items	Only modify N2 on pseudo items
3-4 (n=9)	44%	33%	22%
5-6 (n=7)	71%	29%	43%
Adult (n=11)	64%	27%	54%

Table 5.4: Scores for Subjects – Excluding those who Never Modified N2

All age groups are more likely to modify N2 on pseudopartitive items than on partitive "the" items and a large portion of those subjects *only* modify N2 when they hear a pseudopartitive.

5.1.4 Discussion

The "The" Experiment was designed to replicate the results of the pilot experiment. With cleaner experimental design, we still see that children are not distinguishing between partitive and pseudopartitive. Children allow the adjective to modify N2 in the partitive less often than they did in the pilot experiment (only 25-30% of the time compared to roughly 50% in the pilot), but they still modify N2 roughly as often in the partitive as they do in the pseudopartitive (Table 5.2). The adults are less likely to modify N2 when presented with partitive structures than when presented with pseudopartitive structures. They clearly differentiate between partitive and pseudopartitive (although they do not show statistical significance because 21% of them never modify N2, regardless of construction –which is allowable by the adult grammar).

Closer inspection of the data shows that 36% of the younger subjects (4 out of 11) and 50% of the older subjects (4 out of 8) never erroneously allowed N2 to be modified in the partitive. Among the adult subjects, this proportion raises to 64%. If we take H_p0 / $H0_{dp}$ to be the adult grammar –disallowing modification of N2 in the partitive— nine of the fourteen adults behaved as expected. However, this leaves 5 adults (36% of subjects) who can allow N2 to be modified in the partitive. This phenomenon of adult barrier violation suggests some ambiguity in the DP or partitive structure. This will be discussed in depth in chapter 6.

5.2 The "With" Experiment

The "With" Experiment contrasted pseudopartitive items with complex noun phrases that were identical to the pseudopartitive items in all ways but one: they used the preposition "with" rather than "of." This experiment investigated the broader question of whether the errors seen in the pilot (and the "The" Experiment) were due to a difficulty recognizing DP as a barrier to movement or whether the errors were due to children being unable to recognize barriers at *all*. Do children always allow the adjective to refer freely? Do children have the same trouble with "with" items as they do with partitive "the" items? When children project syntactic structure, do they differentiate between the pseudopartitive and complex noun phrases containing "with"?

In contrast to the partitive and the pseudopartitive, the complex noun phrase in (9) is clearly a noun-adjunct structure.

(9) a pot with beans

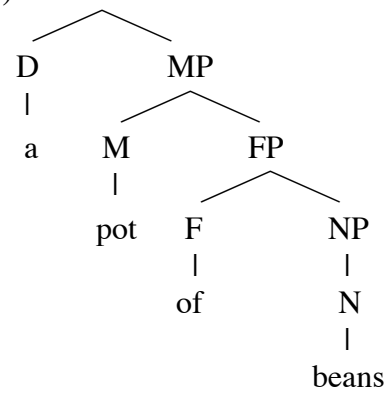
(10) a pot of beans

The phrase in (9) is headed by "pot" and "with beans" just tells us more information about the pot. "with beans" is not selected/required by the head noun. The pseudopartitive (10) is headed by N2. And what of the partitive (11)?

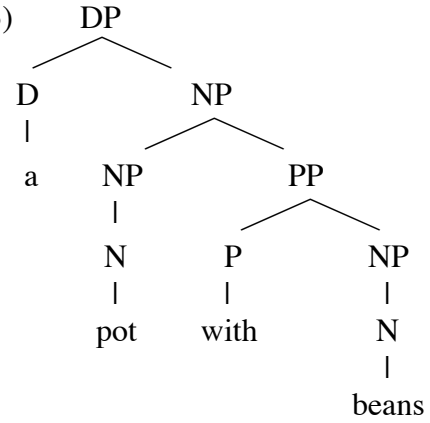
(11) a pot of the beans

Although the partitive is not part of this particular experiment it is useful to explore how it differs from the prepositional structure in (9). The partitive seems to be typologically between the two structures in (9) and (10). The partitive is headed by N1, which is a noun that measures. Semantically the partitive's N1 gives us a particular amount that requires, as its complement, another noun, N2, which tells us what the first noun is measuring. This is similar to the pseudopartitive, but N1 in the pseudopartitive is clearly a Measure Phrase that modifies the head, N2 (See Chapter 3 for more discussion). In (9), N1 is the head and "with beans" is an adjunct. It gives us information about the head noun, N1, but is not semantically required by it.

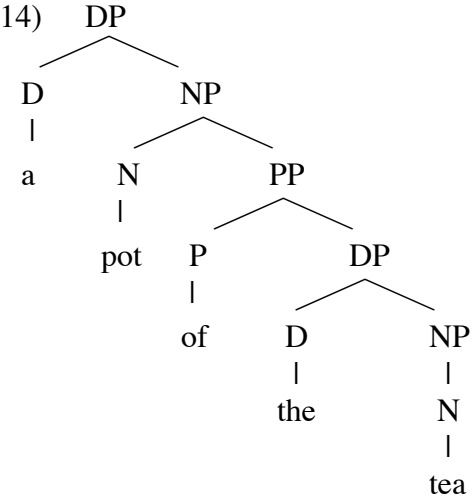
(12) [pseudopartitive structure]



(13) [prepositional adjunct structure]



(14) [partitive]



Notice that the preposition in (13) is NP-adjoined, while the preposition in the partitive is a complement to the noun (14). Additionally, the preposition in (9) and (13) is clearly a

preposition in English and is never ambiguous as to its phrasal (lexical/functional) status. "Of" on the other hand is ambiguous between a preposition and a purely functional item that lacks semantic content (see Chapter 3). On the surface, though, the phrases in (9) and (10) are minimal pairs.

By contrasting these minimal pairs we can ask if children *ever* constrain adjectival modification "correctly" and consistently. A N-P-N structure with a non-ambiguous preposition and adjunct attachment should be easy to identify as a barrier to adjectival modification. Do children differ in whether (or how often) they violate this barrier in comparison to how they fare with the partitive structure? A preliminary discussion on how children fare on the partitive versus the "with" structures is presented in §5.3. Further discussion can be found in Chapter 6.

This experiment, like all three experiments in this chapter, uses the methodology and materials described at the beginning of this chapter. In the "With" Experiment subjects were given pseudopartitive items (3) and complex noun phrases containing "with" (4), each preceded by an adjective.

(3) The seal wanted a broken plate of cookies.

(4) The seal wanted a broken plate with cookies.

The picture choice allowed them to choose between a case where the adjective modified N1 (the plate is broken) and a case where the adjective modified N2 (the cookies are broken. The third picture choice was a foil where nothing was broken.

In the adult grammar, the adjective in (4) can only modify N1 because the adjunct status of the PP creates an island for modification (and extraction, see §5.2.4.1). Assuming children have mastered adjunction and can recognize N1 as the head of the construction, they, too should never allow the adjective to modify N2.

There were two versions of this experiment, in complementary distribution. The stories are numbered 1-10 for convenience of reference (see Appendix B), but the stories were randomly ordered for each subject. In one version, the odd items were complex-N-"with" items and the even items were pseudopartitive items (version a). In the other version, the odd items were pseudopartitive items and the even items were complex-N-"with" items (version b).

In this experiment as with all others containing these materials, each subject saw 10 items. Each item contained a story that ended in a picture choice. In the "With" Experiment, as with the other two experiments subjects heard 8 experimental items and two controls. For each subject, two of the ten stories were chosen at random to be control items. The control items had the adjective in a position preceding N2 (8).

(8) The seal wanted a plate of broken cookies.

5.2.1 Subjects

Twenty-seven subjects participated in The "With" Experiment. There were eight subjects in the younger group; 3 three year olds and 5 four year olds, mean age 4;0. There were eight subjects in the older group; 4 five year olds and 4 six year olds, mean age 5;11. There were 11 adults. Of the younger group, 5 saw version a and three saw version b. Of the older group, 3 saw version a and five saw version b. Of the adults, 6 saw version a and 5 saw version b.

5.2.2 Predictions

I hypothesize here that children acquire adjunction very early on in the development of grammar. For this reason, they should recognize adjuncts as islands for extraction (H_w0). Hence children and adults should only modify N1 on the Complex-noun "with" items. A counter hypothesis supposes that children allow adjectives to spread anywhere in the nominal domain (and perhaps even further). If this were the case, we would expect to see children treating the Complex-noun "with" items the same as they treat the pseudopartitive items (H_w1).

	Complex-N "with"		**Pseudopartitive**	
	Modify N1	**Modify N2**	**Modify N1**	**Modify N2**
H_w0 (adult)	Y	N	Y	Y
H_w1	Y	Y	Y	Y

Table 5.5: Predictions for "With" vs. Pseudopartitive

5.2.3 Results

The results of this experiment are both expected and surprising (Table 5.3 & Fig. 5.2). Unlike the "The" Experiment, all subjects are clearly distinguishing between the pseudopartitive and the other option, in this case prepositional adjunct, "with", items. I have separated 3 and 4 year olds in Table 5.6 to illustrate the rapid decrease in error across age. For comparison with other charts in this dissertation the "with" errors for the younger group as a whole are at 21.88% (as seen in Fig. 5.2).

Age	**Control**	**Complex-N "with"**	**Pseudopartitive**
3 yr old	50.00%	33.33%	91.67%[41]
4 yr old	77.78%	15.00%	70.00%
Older: 5-6	81.25%	15.63%	40.63%
adult	100.00%	2.27%	25.00%

Table 5.6: Percentage of Times N2 was Modified for Each Item Type

We can see that all age groups show vastly different modification patterns between "with" items and pseudopartitive items –and that expected adult-like patterns of performance improve with age.

[41] It is interesting to ask why the pseudopartitive N2 scores are so high in contrast to the "with" scores. I do not attempt to solve this problem here, but it may be due, simply, to the contrast. Perhaps subjects recognize the pseudopartitive as being headed by N2, but do not in normal contexts feel compelled to modify N2 –but when faced with items that are clearly headed by N1, the ability to modify N2 in the pseudopartitive becomes more pronounced.

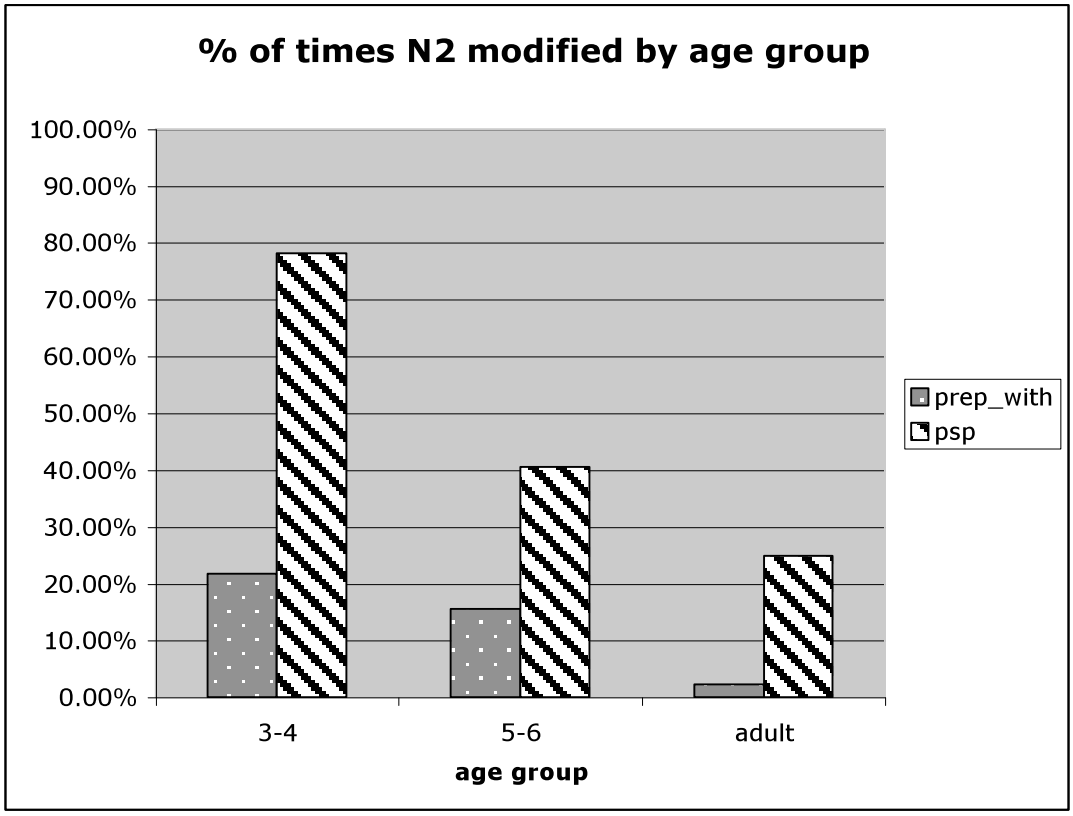


Figure 5.3: Percentage of Times Each Age Group Modified N2 on "With" and Pseudopartitive Items.

A repeated measures ANOVA was run on this data. The dependent variable was the "with" score versus the pseudopartitive score (based on whether they modified N2 for each item type). Age group was the independent variable. All age groups significantly differentiated between the "with" construction and the pseudopartitive construction ($F(1,24) = 46.112$, $p = .00$). There was also a significant interaction between age group and with/pseudo score ($F(2,24) = 4.358$, $p = .024$). Pairwise comparisons showed that in terms of differentiating between the "with" construction and the pseudopartitive construction 3-4 year olds differed significantly from 5-6 year olds ($p = .019$) and from adults ($p = .00$). The 5-6 year olds did not differ significantly from the adults on this measure ($p = .085$).

A Univariate ANOVA was run on this data with the "with" score as the dependent variable and age group as the independent variable. Age was a significant factor in how often N2 was modified in the Complex-noun "with" constructions ($F(2,26) = 3.828$, $p = .036$). An additional Univariate ANOVA was run on this data separating the independent variable into individual ages (3, 4, 5 & 6, seeing as the 3 year olds differed so drastically from the 4 year olds) and keeping the dependent variable as the "with" score. Age was still a significant factor in how often N2 was modified in the "with" constructions ($F(4,26) = 2.719$, $p = .056$). Interestingly enough, despite the strongly significant results for the "With" Experiment, all of the children modified N2 at least some of the time (compared to 72.7% of children in the "The" Experiment). 36% of the adults never modified N2, regardless of construction (Table 5.7).

Age	**Modify both**	**Psp more**	**With more**	**Never low**	**Only psp**	**Both equal**
3-4	62.5%	100%	0%	0%	37.5%	0%
5-6	37.5%	75%	25%	0%	50%	0%
Adult	9%	100%	0%	36%	55%	37%

Table 5.7: Further Breakdown of Data from the "With" Experiment: Percentage of Subjects who Showed Various Modification Patterns.

Despite the fact that most subjects modified N2 as some point in the experiment, 91.3% of all subjects modified N2 in the pseudopartitive more often than N2 in the "with" constructions. For those seven adults who modified N2 at all, all of them modified N2 more often on pseudopartitive items.[42]

[42] Of those adults who modified N2 at all, only one of the seven modified N2 on a "with" construction, and he did that only once – this accounts for the 86% in Table 5.2-3 and the 2.27% error in Table 5.2-1.

Age	Psp more	Only psp
Adult (n=7)	100%	86%

Table 5.8: Response Patterns of Adults who Allowed N2 Modification

5.2.4 Discussion

In contrast to the replication experiment with the pseudopartitive and "the" partitives, children in this experiment clearly distinguished between pseudopartitive items and "with" items (See §5.3 for more discussion comparing the "The" Experiment with the "With" Experiment). Statistically all subjects are clearly distinguishing between the prepositional adjunct items and the pseudopartitive items. Although the children do make errors on "with" items, the error rate rapidly drops by age 4 and is much lower than the error rate on "the" items in the previous experiment. The error rate on the control items is almost identical to the error rate on the "with" items for all subjects. All of this suggests that any error with "with" is not caused by the same factors as errors on partitive items.

These data show that children are not completely flexible with adjectival modification. They do not freely apply it to any node within the nominal domain. Children recognize that "with" is very different from "of" in these cases --not only is it a preposition with clearer semantic content, but it signals a different syntactic geometry. Recognizing this difference for some reason, seems to trigger children to be even freer with the application of the adjective to N2 in the pseudopartitive, highlighting the contrast between the two constructions. All children

identify a clear contrast between pseudopartitive and prepositional adjunct items. They know that they are different. The adults who treat both "with" constructions and the pseudopartitive the same are the ones who never modify N2 on either construction. The adults never allow the adjective to modify past "with." The 2% error rate above represents one error (out of four "with" items) for one adult (out of 11). This is clearly a genuine error.

Despite the lowered error rates, the youngest children do seem to be having some difficulty restricting the adjective in the "with" cases. I suggest that this may be a separate issue. Data from Ramos 2000 (§2.2.4) showed that roughly 10% of children under the age of 5 allowed the adjective in phrases such as "the yellow horse's sign" to refer to the second noun. In this case, the adjective is not c-commanding the noun it modifies (as with the adjunct-"with" construction (13)). This error is gone by age 5. Otsu 1981 used extraction from PPs as controls for his study investigating children's mastery of extraction from relative clauses. It is worthwhile to briefly review his results here.

5.2.4.1 Otsu

Otsu (1981), in his Pilot_A experiment investigating children's acquisition of relative clauses, uses wh-extraction from "with" phrases as a control for relative clause wh-extraction items. These control items are listed below. All items were accompanied with disambiguating pictures. Items A1 and B1 involve extraction of N2 from a complex noun phrase with a prepositional "with" complement (parallel to the items used in the "With" Experiment). I

view this as parallel to an adjective moving out of N2. If the prepositional phrase is an adjunct, it should be an island for extraction.

A1.

Bill is pointing at a [girl with flowers].
He is pointing at a girl with his fingers.
What is Bill pointing at a girl with?

B1.

John is bandaging a [cat with a broken leg].
He is bandaging a cat with a handkerchief.
What is John bandaging a cat with?

Otsu tested 72 children, aged 3-10, with eight children in each age year.[43] I show Otsu's results for children aged 3-6 in Tables 5.9 and 5.10. On A1 and B1 items, children performed as follows.

Age	**A1**	**B1**	**Error Rate**
3	50%	75%	39%
4	100%	88%	6%
5	87%	100%	6%
6 (avg)	57%	100%	21%

Table 5.9: Percentage Correct Answers Disallowing Extraction from "With" Items.

The error rate on A1 & B1 for Otsu's 3 year olds is roughly the same as in my data (compare Otsu's 39% error to the 33% error in the "With" Experiment). This number then decreases quite dramatically for 4 and 5 year olds. This error rate, however, then rises sharply for the

[43] There were actually sixteen 6 year olds among Otsu's subjects. They were from two different schools in two different areas. The percentages for six year olds in Table 5.9 and Table 5.10 are averages of these two groups.

older children. It is unclear how seriously we can take this particular data. The slightly better performance of Otsu's 4 and 5 year old's may be due to the fact that the correct answer is based on the last thing the child heard. A complete analysis of Otsu's data would need to address recency effects. I introduce this data to show that the error rates for "with" items in the "With" Experiment are supported by Otsu 1981.

Otsu's items A3 and B3 are less directly relevant but still very interesting to discuss. They look at extraction of a modifier attached to N2 of a complex noun phrase. In A3 "picture of a boy" has the same structure as the partitive. In B3 "a book about a dog" has a strong determiner like "with," which may or may not have adjunct status.

A3.

James is painting a picture of a [boy with a book]
He is painting a picture of a boy with a brush.
What is James painting a picture of a boy with?

B3.

Jill is writing a book about a dog with a long tail.
She is writing a [book about a dog] with a green pencil.
What is Jill writing a book about a dog with?

On A3 and B3 items, children performed as follows.

Age	A3	B3	Error Rate
3	0.75	0.75	0.25
4	0.63	0.75	0.31
5	0.75	1.00	0.12
6 (avg)	0.75	0.75	0.25

Table 5.10: Percent Blocking Extraction of Modifier from Complex NP.

Again, children perform well on these items, showing a basic knowledge of adjunct items. If we informally factor in recency effects, we must assume that children's performance on these items is actually worse because the recency effects may have improved their chance at success. In light of this, the fact that children are able to constrain the adjective in the "With" Experiment is even more striking. Clearly, children know that adjectives are constrained with respect to where they can apply in the nominal domain. This suggests that we need to take a closer look at partitives and why they don't always trigger a barrier to adjectival movement. First I will take a closer look at the contrast between the "The" Experiment and the "With" Experiment.

5.3 Comparing "The" and "With"

Let's take a moment here to compare subjects' performance on the "The" Experiment and the "With" Experiment. In the "With" Experiment, only one error was made by one adult (2% of total "with" responses). In contrast, in the "The" Experiment (different subjects), five adults allowed the adjective to modify low a total of eight times (14% of total "the" responses).

This suggests, coupled with the adult bias for modifying high,[44] that there is something about "the" that causes the grammar to be more likely to treat it as transparent for movement/modification —if not for all adults, then clearly for a subset of adults. Children also were better able to restrict the adjective on Complex-noun "with" items than on partitive "the" items (Fig. 5.3), although the difference is not as great as in the adult data.

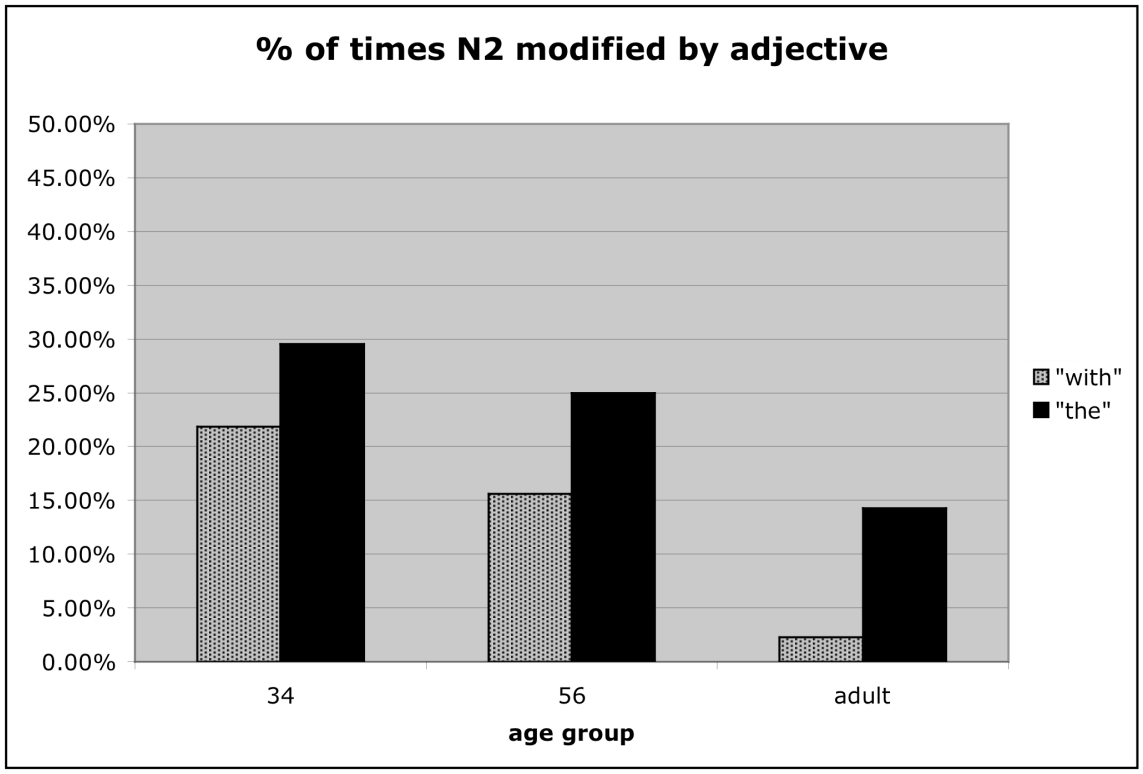


Figure 5.4: Percentage of Times Subjects Modified N2 on "With" Items versus Partitive "The" Items.

An ANOVA was run on this data. The "the" and "with" scores (treated as one score in this case and distinguished only by which experiment it related to) were the dependent variable

[44] 29% of all adult subjects never modified N2. 83% of adults modified N2 ≤ 25% of the time (for all 8 non-control items in their particular experiment). This suggests a bias for modifying N1.

and age group and experiment type were the independent variables. The difference in performance by age group is approaching significance ($F(2,59) = 2.943$), $p = .061$).

We can clearly see a contrast between the two experiments in how subjects differentiate between the target item and the pseudopartitive (Figs. 5.4 & 5.5). In the "With" Experiment children differentiated significantly between the two items types even in the lower age group (Fig. 5.4). Children in the "The" Experiment did not significantly differentiate between partitive and pseudopartitive items (Fig. 5.5).

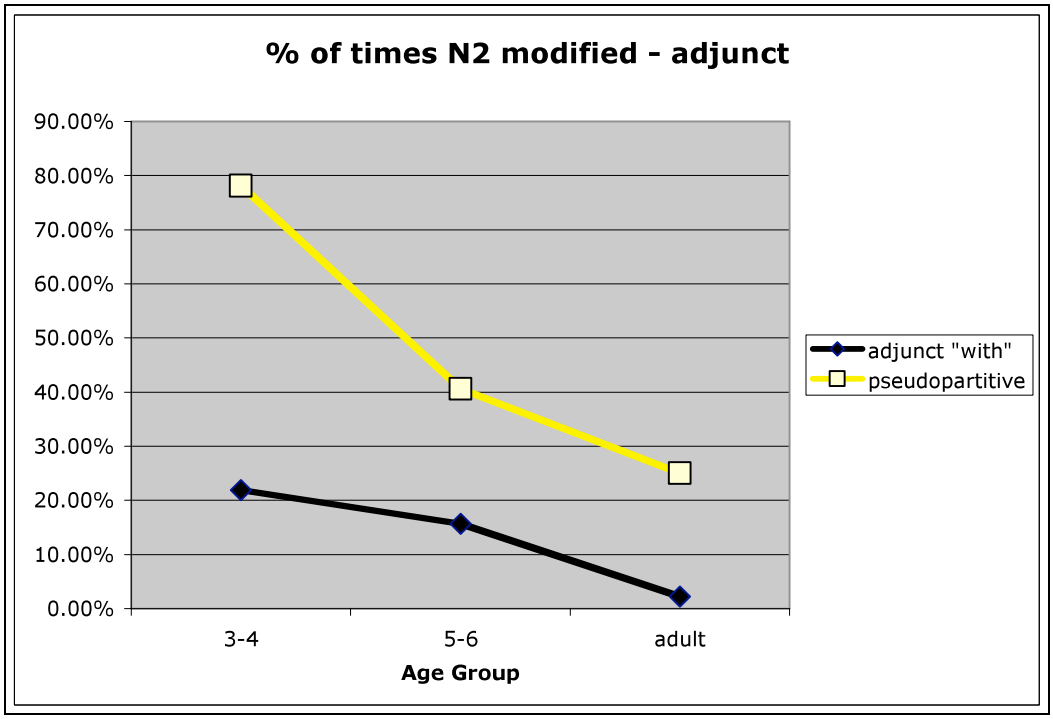


Figure 5.5: Difference between "With" and Pseudopartitive N2 Modification.

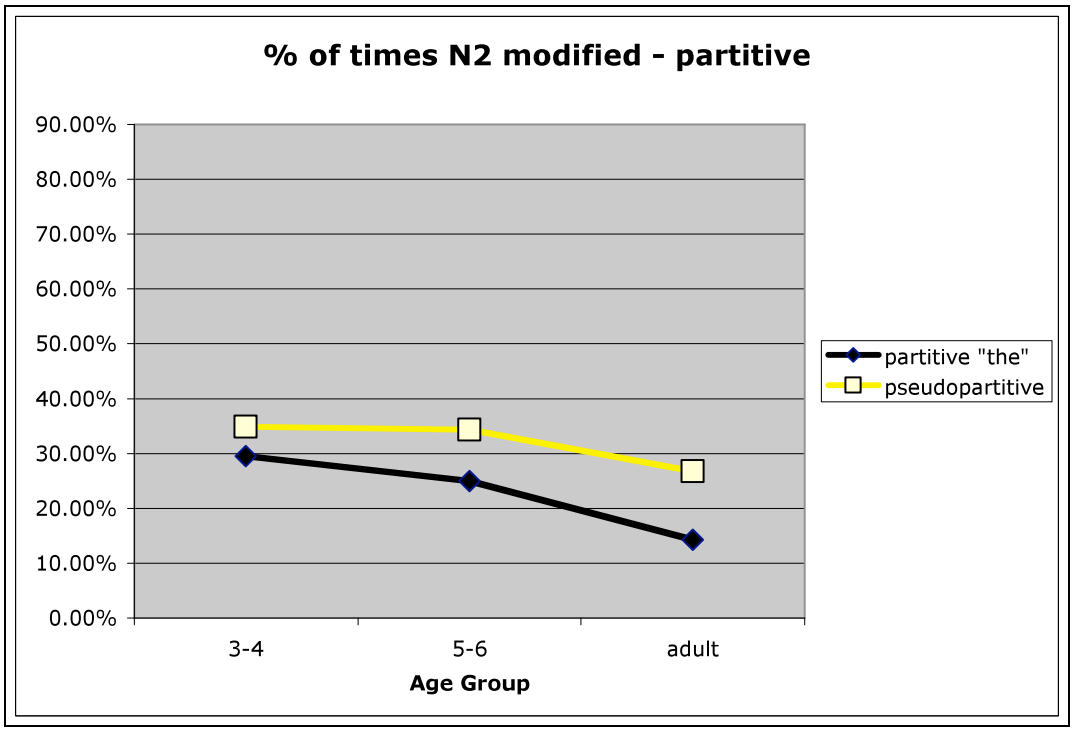


Figure 5.6: Difference between "The" and Pseudopartitive N2 Modification.

To more fully explore the relationship between the two experiments, the data were collapsed. Both experiments yielded a pseudopartitive score. A new score was created to calculate the difference between pseudopartitive items and "the"/"with" items –the Overall Task Score. This score was created by subtracting the "the"/"with" score from the pseudopartitive score, creating an overall task score. The logic being, that if one were to modify N2 at all, one should modify N2 in the pseudopartitive. Thus, a negative score would be ungrammatical based on the predictions of the adult grammar. A univariate ANOVA was run on this data. The overall task score was the dependent variable and age group and experiment version the independent variables. There was a significant difference between the "With" Experiment and the "The" Experiment on the Overall Task Score ($F(1,54) = 11.916$, $p = .001$) –showing that subjects behave differently with "with" items than with "the" items.

These data point toward the definite article as the source of children's trouble with constraining the adjective in the partitive structure. But is it just the definite article? Do children behave this way regardless of what D-item appears in the partitive?

5.4 The DP Experiment

Does the choice of D-item affect the ability the speaker to project a barrier to adjectival movement? This experiment was designed to investigate whether the definite determiner "the" was the source of children's ability (and the ability of 25% of the adults) in the pilot experiment to allow the adjective to modify N2 in the partitive.

This experiment, like all three experiments in this chapter, used the methodology and materials described at the beginning of this chapter. In the DP Experiment, subjects were given only partitive items (and two controls). These items contrasted the definite determiner (15a) with the demonstrative (15b), a possessive pronoun (15c) and a full possessive phrase (15d).

(15) a. a broken plate of the cookies

b. a broken plate of those cookies

c. a broken plate of her cookies

d. a broken plate of the mom's cookies

Demonstratives used in the experiment included “that” and “those”. The possessive pronouns used were “his” and “her”. Possessive phrases were “the man’s”, “the mom’s”, “the monkey’s”, “the girl’s”, “the giant’s”, “the store’s” and “Gina’s”. For a complete list of all permutations of items see Appendix B.

Each subject heard two of each type (15a-d) and two control items with adjective adjacent to N2 (8) For each subject, two of the ten stories were chosen at random to be control items.

(8) The seal wanted a plate of broken cookies.

For each subject, the eight stories containing target items were randomized for which DP type they contained. The initial subject design contained four “the” items and one or two of each DP-type. Halfway through the experimentation process, this format was changed to two of each DP type in (15a-d). For further specifics and discussion of how this affected the results, see §5.4.2.

The picture choice allowed subjects to choose between a case where the adjective modified N1 (the plate is broken) and a case where the adjective modified N2 (the cookies are broken. The third picture choice was a foil where nothing was broken. If the subject recognizes that any of these D-items are full DPs, he should recognize it as a barrier to adjective movement, and, hence the only possible interpretation is one where the adjective modifies N1 because that’s where it appears in surface structure. If a subject does not recognize that these items are full DPs, then there will be no barrier to adjectival movement and he should allow the

adjective to modify in either position. If it is possible that some D-items such as "the" have the option to be reanalyzed as belonging to a different node (or incomplete DP), then this experiment may be able to pick out the beginnings of just what features are necessary for projecting a full DP.

In this experiment as with all others containing these materials, each subject saw 10 items. Each item contained a story that ended in a picture choice. The stories contained enough context to make felicitous a definite item that was used. In the DP Experiment, as with the other two experiments subjects heard 8 experimental items and two controls.

5.4.1 Subjects

There were 48 subjects. There were ten subjects in the younger group (5 three year olds and 5 four year olds, average age 4;1) and eleven subjects in the older group (5 five year olds and 6 six year olds, average age 5;11). There were 27 adult subjects.

5.4.2 Results

Unfortunately, the number of each type of item that each subject saw was not consistent, so we can only take impressions from the data below, but not draw any strong conclusions from it. The initial assumption in the experiment design was that determiners would pattern in two

categories: "the" and *everything else*. The first 33 subjects saw four "the" items and four "other" items with demonstrative, possessive phrase and possessive pronoun randomly assigned to the other four experimental pictures –which meant that each subject did not see an equal number of each of the non-"the" determiner types, and that some subjects only saw a subset of determiner types. The 33 subjects who saw this version of the experiment included all five of the three year olds, four 4 year olds, all five 5 year olds, all six 6 year olds and thirteen adult subjects.

The experimental design was later revised so that each subject saw two of each experimental item type (15a-d) and two controls. This version of the experiment was seen by one 4 year old and fourteen adults. The results below are interesting and beg follow up with a consistent and statistically testable design.

The results of this experiment were surprising from the perspective that the trouble in the pilot is with "the" (Table 5.11).

Age group	**Control**	**"the"**	**Demonstrative**	**Possessive phrase**	**Possessive pronoun**
3-4 (n=10)	78.95%	26.47%	10.00%	15.38%	0.00%
5-6 (n=11)	93.75%	25.81%	36.36%	9.09%	11.11%
Adult (n=27)	96.36%	14.10%	25.58%	16.33%	22.22%

Table 5.11: DP Experiment: Percentage of Times Adjective Modified N2.

Table 5.11 shows us that there don't seem to be any patterns emerging and that each determiner type is just as likely to allow N2 to be modified. It appears that possessives

allowed N2 to be modified to a slightly lesser degree, but this distinction disappears with age (Fig. 5.6).

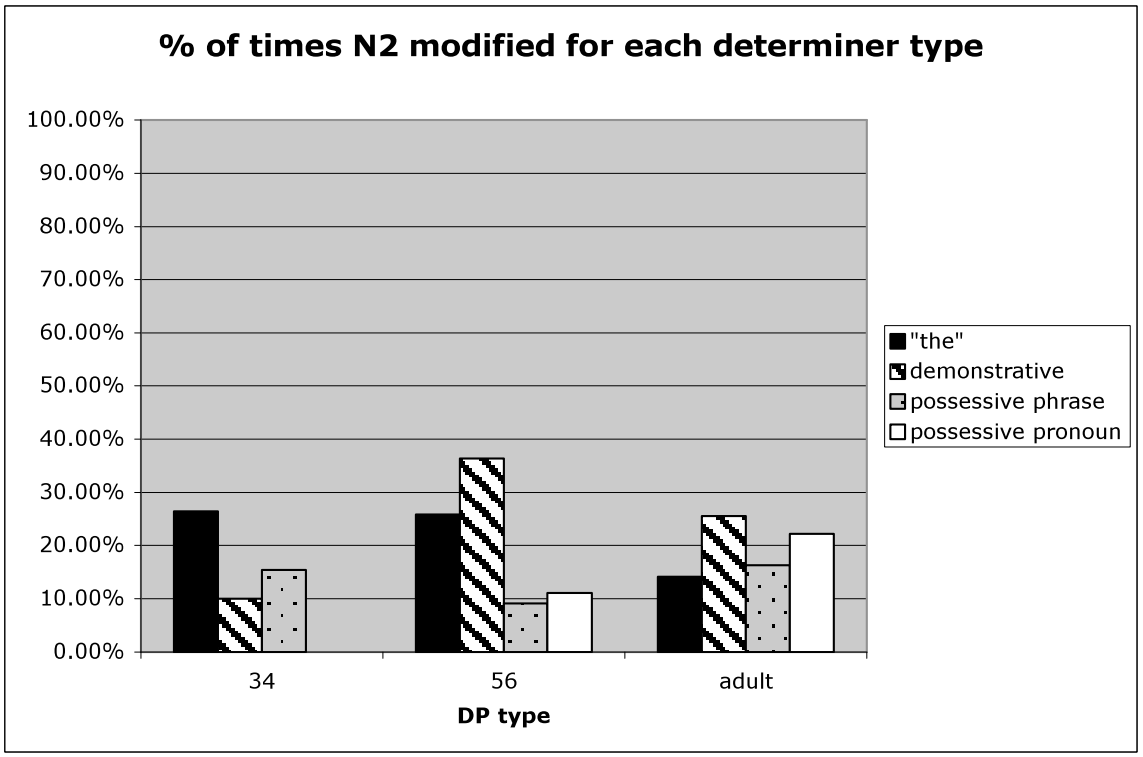


Figure 5.7: DP Experiment: Percentage of Times N2 was Modified.

It appears that subjects can modify N2 regardless of which item is in DP. Demonstrative and "the" are most likely to be transparent for adjectival modification, but all options are fair game.[45] The children are allowing the adjective to modify N2 25-30% of the time for demonstrative and "the" items. These are the same numbers seen in the "The" Experiment, suggesting that demonstratives get treated in a similar fashion to the definite article. Interestingly enough, the adults have a similar error rate on the demonstrative items and their performance on the possessive items is on par with their performance on "the" items. Figure

[45] The child data here should be taken with a grain of salt, especially for the possessive items. The randomization process was faulty when I first started running this experiment. Many of the children did not always see a possessive item during their session. The kinks were worked out for the majority of the adult controls.

5.7 splits the DPs into two groups, possessives and determiners and shows that adults are not contrasting among item types.

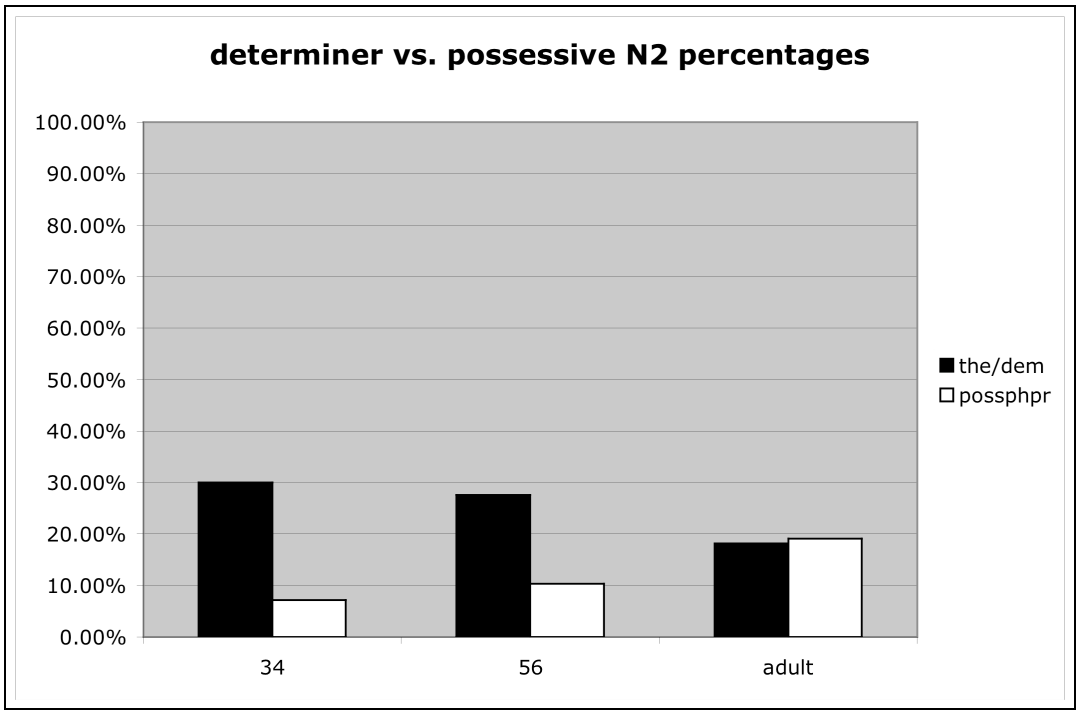


Figure 5.8: Percentage of Times N2 was Modified on "The" and Demonstratives versus Possessive Items.

On top of the fact that many of the child subjects did not see possessive items, these numbers are a bit misleading because 29.6% of subjects never modified N2 at all and 63% modified N2 0-1 times. Tables 5.12 and 5.13 show a further breakdown of the data.

Age	**Modify past all DP types**	**Never modify N2**
3-4	0%	20%
5-6	0%	36%
adult	4%	30%

Table 5.12: Percentages of Subjects who had Various Modification Patterns.

Age	Modify past "the" the most	Modify past demons the most	Only modify past the/dem	Modified past possessive
3-4 (n=8)	75%	13%	75%	25%
5-6 (n=7)	57%	0%	57%	43%
Adult (n=19)	21%	21%	37%	63%[46]

Table 5.13: Percentage of Subjects who had Various Modification Patterns —Excluding those who Never Modified N2.

It is immediately apparent from this breakdown of the data that the adults seem to be more confused than the children. 70-80% of subjects (regardless of age group) allowed the adjective to modify N2 at least once. Children show a preference for only modifying past the demonstrative or "the", while adults seem equally likely to modify N2 on any type of item. 70% of the adults modified N2 on at least one item. 53% of those adults modified N2 two or more times over the course of the experiment. 31.5% of those adults who allowed N2 modification at all, allowed it to happen three or more times over the course of the experiment. This again suggests that there is a subset of adults for who the adjective is less constrained and that this is what accounts for the percentages seen in Table 5.11. Additionally, the 31.5% is reminiscent of the numbers seen for weak DP in the experiments of Schafer & de Villiers 2000 and Carlson et al 2006 (Chapter 2). For the children, the errors are more focused on demonstrative and "the" partitives, but the percentage of subjects making errors is the same. 50% of 3-4 year olds and 45% of 5-6 year olds modified N2 0-1 times.

[46] 26% of adults who modified low only modified past the possessive items.

CHAPTER 6

DISCUSSION

6.1 Summary of Results

6.1.1 Pilot Summary

The Pilot Experiment showed that children did not distinguish between partitive and pseudopartitive. It also showed that 25% of adult subjects allowed N2 to be modified in the partitive. However, the pilot's experimental design was not traditional and needed a more carefully constructed follow-up study to replicate the results.

6.1.2 The "The" Experiment Summary

The "The" Experiment roughly replicated the results of the Pilot Experiment. When given a contrast between a partitive containing "the" (1) and a pseudopartitive (2), children treat them roughly the same, allowing the adjective to modify N2, "cookies", about 30% of the time.

(1) a broken plate of the cookies

(2) a broken plate of cookies

There was a significant difference between the adult and child responses, but no significant difference between how subjects behaved on partitive and pseudopartitive items. Children as a whole modified N2 in the partitive 25-30% of the time and N2 in the pseudopartitive 34% of the time. Adults modified N2 in the partitive 11% of the time and N2 in the pseudopartitive 18% of the time.

As in the Pilot Experiment, children are not differentiating between partitive and pseudopartitive items. The adults in this study are less likely to modify N2 in the partitive than they were in the pilot. Each subject only occasionally modifies N2, usually once or twice out of the 8 target items.[47] However, adult subjects were equally as likely to modify low in the partitive as they were in the pseudopartitive if they were going to modify low at all.

This experiment tells that both children and adults are clearly not distinguishing between the partitive and the pseudopartitive. It also gives us hints that there are some people (adults and children) who prefer to have the adjective always modify what it's adjacent to (in these cases N1) and that this tendency increases with age.

[47] Unfortunately, if you are an adult, it seems you are either a partitive or a pseudopartitive modifier, not both, —only one subject modified N2 on both construction types in the "the" Experiment. This cannot be noise, however, because adults consistently exhibited this behavior in the DP Experiment and yet did not show this percentage or pattern *at all* on the prepositional adjunct items in the "With" Experiment.

6.1.3 The "With" Experiment Summary

In contrast to the "The" Experiment, all age groups made clear distinctions between the adjunct "with" items (3) and pseudopartitive items.

(3) a broken plate with cookies

The percentage of times N2 is modified in the "with" items is 22% for the youngest group[48] and drops rapidly from there. The contrast also seems to bring the pseudopartitive scores higher. Perhaps subjects so clearly recognize that the prepositional adjunct in the "with" items is a barrier to adjective movement that it emphasizes the fact that there is no barrier in the pseudopartitive items.

These data illustrate that children do not freely apply adjectives in all complex noun phrases. The higher percentage of N2 modification for the younger children can be argued to be due to some other difficulty with prepositional adjuncts (Otsu 1981). At the very least, it is clear that children know that modifying N2 in the pseudopartitive is an available option in contrast to the adjunct-"with" constructions.

[48] 3 year olds had a 33.3% error rate on the "with" items, but this can be argued to be a problem with mis-analyzing adjuncts as complements (see also §5.2.3.1). The error rate drops to 15% by age four.

6.1.4 The DP Experiment Summary

The DP Experiment did not reveal the expected contrasts. It was designed to investigate which DP items might exhibit transparency for adjectival modification. The assumption was that particular lexical items might have weaker DP features than others. Weaker DP features would give rise to few nodes being projected and the potential for the determiner not triggering a barrier feature. This was not seen to be the case. Children are clearly more likely to modify low with "the" (1) and demonstrative (4) items than with the possessive items (5), but the data is not reliable due to errors in experimental design.

(4) a broken plate of those cookies.

(5) a. a broken plate of the mom's cookies

b. a broken plate of her cookies

The adults showed a strong preference for modifying N1, but were not consistent in what items allowed N2 modification (if they allowed it at all).

Of the 25 adults subjects in the DP experiment, 7 (28%) never allowed the adjective to modify N2 at all. Remember, the assumption at the outset of this investigation was that adults should never be able to modify N2 in partitive structures. Of the 18 (72%) who did allow the adjective to modify N2 in the partitive, 9 only allowed it to do so once out of the 8 target items (3 on possessive partitives, 6 on demonstrative/"the"). Of those who allowed the adjective to modify N2 at all (regardless of how many times), seven only allowed the

adjective to modify past "the" and/or the demonstrative, five only allowed the adjective to modify past possessives, and six allowed the adjective to modify past both types. This is quite an even split. Unfortunately, due to inconsistent experimental design, statistical analysis could not be done. The adult data suggest that the adult grammar has the option of N2 being modified by the adjective in the partitive, but that this it is not the dominant option. Why is it not the dominant option? Possibly because there is a bias for the adjective modifying what it is adjacent to.

6.1.5 Complement DP versus Adjunct NP

While the DP Experiment does not give us statistically analyzable results, the adult data are clearly not noise in light of the data from the "With" Experiment. When adults are faced with a noun with a clear prepositional adjunct they never modify N2. This suggests, especially in light of the adult bias for modifying N1, that the 11%-23% spread on adult partitive errors (in the "The" Experiment and the DP Experiment) is due to the adult grammar. Additionally, there is a clear contrast (and significant difference) between subject performance on adjunct and pseudopartitive items in the "With" experiment that is not seen in the other two experiments.

Children's ability to constrain the adjective in "With" Experiment and the "The" Experiment were compared using a ANOVA and there was near significance for all age groups on their treatment of partitive "the" items and adjunct "with" items. The ability of each age group to

differentiate the partitive from the pseudopartitive was much less reliable than their ability to differentiate the complex-noun "with" items from the pseudopartitive. This difference was highly significant.

The data from the "With" Experiment and their contrast from the data from the "The" Experiment (and the DP Experiment) show us that children cannot freely apply adjectives anywhere in a complex noun phrase. They know that there are constraints, but they do not always recognize constraints in partitive items. It seems, as well, that some adults reach adulthood without ever changing this analysis.

So what is this analysis? What are children (and some adults) doing that allows an adjective adjacent to N1 to modify N2? In the following section, I will suggest that an incomplete projection of the nodes associated with DP will allow free adjective movement. This is the movement that I showed to be blocked in Chapter 3 (§3.3). Before suggesting an analysis, I will return briefly to the hypotheses proposed in Chapters 2 & 3 (§6.1.6). In §6.2, I will suggest what an incomplete DP structure might look like and suggest how it factors into the grammar and acquisition. In §6.3, I will suggest an alternate account of the data based on headedness.

6.1.6 Evaluating the Hypotheses

Let us now return to the hypotheses presented in Chapters 2 & 3. I will begin with the hypotheses regarding the acquisition of DP.

$H0_{dp}$: Children have a fully articulated adult-like DP structure from the beginning (or from the first instance of identifying determiners in the language).

We can easily rule out $H0_{dp}$. Of the eleven children in the younger group who participated in the "The" Experiment, seven (63%) modified N2 on partitive items. 80% of the children in the younger group who participated in the DP Experiment modified N2 (all items, except controls, in this experiment were partitive). If children had the DP structure as proposed for adults in §3, then they would never modify N2.[49]

$H2_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. Once they identify DP they project it fully everywhere.

We can rule out $H2_{dp}$ as well. If children reach a certain point in their development in which they project DP fully for every determiner, then we should see an age at which the errors virtually disappear. We don't even see this pattern in the adult grammar. The only place in my experimentation where we can clearly see the disappearance of errors is in the modification of N2 on the Complex-noun "with" items. Adults make virtually no mistakes and the children's error rate rapidly decreases with age.

[49] Of course, not all of the adults in the "The" Experiment and the DP Experiment modified exclusively N1 on the partitive items. Regardless, if the younger children were performing in an adult-like fashion, the percentage of their N2 interpretations would be lower than it is.

$H3_{dp}$: Children initially project only NP until they have sufficient evidence to project a DP. They are aware that determiners can have a variety of features. Until they have fully acquired a construction, they will project minimal DP structure and look for pragmatic cues as evidence for more DP structure.

The data in the four experiments is consistent with $H3_{dp}$. Children in these experiments clearly use determiners in casual speech and understand many of their properties —especially by the time they reach age 5 or 6 (Kupisch 2006). Most of these children also allow modification of N2 in the partitive. If they don't recognize/project the barrier feature in DP, then they are free to modify N2 when it fits with the pragmatic information that they are receiving. Hypothesis $H3_{dp}$ had two sub-hypotheses.

$H3a_{dp}$: Once children have mastered a range of constructions containing DP in English, they will begin to project a full DP as the default when encountering new constructions. This is the adult grammar/strategy.

$H3b_{dp}$: Regardless of how many DP-containing structures the child encounters, he will continue to project the minimal DP as the default when encountering new constructions. This is the adult grammar/strategy.

Distinguishing between $H3a_{dp}$ and $H3b_{dp}$ remains an open issue. The behavior of the adults in the four experiments in this dissertation suggests that there may be a dialectal split –some adults default to a strong (complete) DP, some to a weak (minimal) DP. I will return to this possibility in §6.2.4. Let's turn now to the hypotheses regarding the partitive structure.

H_p0: English-speaking children's partitives are target-like from the beginning, creating a barrier to adjectival modification of N2.

H_p0 is clearly ruled out. In the Pilot Experiment, the "The" Experiment and the DP Experiment children failed to significantly differentiate between partitive and pseudopartitive.

H_p1: English-speaking children's partitives are not target-like and young children use simple combinatorial processes when faced with complex noun phrases. These combinatorial processes will combine the adjective with the closest noun-like element, regardless of construction type.

We can also rule out $H_1$1. A child who used this strategy would have the adjective exclusively modify N1 and never modify N2. In the "The" Experiment, only two children in the younger group and one in the older group exhibited this pattern. In the DP Experiment only two children in the younger group and four in the older group exhibited this pattern. While it may be the case that these particular children employed this strategy, it is certainly not the strategy exhibited by the majority of subjects. This leaves us with H_p2.

H_p2: English-speaking children's partitives are not target-like and young children start out projecting partitives that lack a barrier feature.

As stated above, children in all three experiments that contained the partitive did not significantly distinguish it from the pseudopartitive. This may be due to a difficulty with projecting barriers in DP or it may be due to some other inability to project an adult-like

partitive structure (i.e. the structure described at the beginning of Chapter 3). I will now address both of these possibilities, starting first with an incomplete DP structure.

6.2 Analysis: Incomplete DP Structure

The results show that, contrary to the syntactic distinctions between partitive and pseudopartitive laid out in Chapter 3, children do not always respect the barrier to adjectival modification in the partitive and adults don't either (although to a much lesser degree). How do we reconcile the results of this research given the partitive structure presented in Chapter 3? Do we need to revise the partitive structure? I suggest, instead, that we revise the structure of DP.

In §6.3, I will present an alternative analysis for representing this contrast that is based on headedness ambiguity. Regardless of which analysis we use, there will still be a need to represent a node for weak or reanalyzed determiners. The analysis of DP in this section is a first step toward reconciling this need.

What is happening when the adjective is appearing adjacent to N1 in the partitive structure but is being interpreted as if it were adjacent to N2? To approach this question, I analyze adjectival modification from a distance as adjective movement (§3.3). Adjectives adjacent to N1 that modify N2 have moved to their surface position from a spot adjacent to N2.

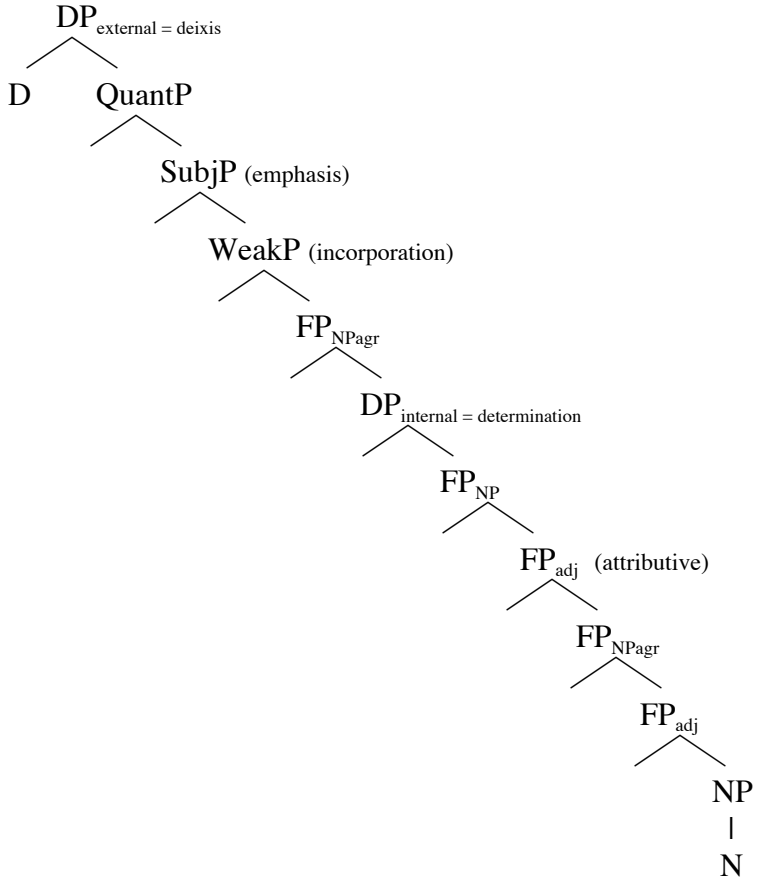
As laid out at the end of Chapter 3, adjectives have the ability to move within DP. In §3.3.1.1 I cited Bošković 2008, claiming that DP prevents adjectives from moving out of the nominal projection. Bošković showed that Serbo-Croatian lacked DP and thus allowed adjective to move to spec,CP, unlike English. In English, adjectives are prevented from moving out of DP due to Anti-Locality and the Phase Impenetrability Condition. There are multiple adjective positions within DP itself (Bernstein 1993, Cinque 1994, Laenzlinger 2000, Zamparelli 2000, Longobardi 2001, interalia). Laenzlinger 2000 argues that adjectives move within the nominal structure from lower positions to higher ones for semantic reasons. I will suggest that children, and some adults, do not project a complete DP. The part of DP that is missing is the part that constitutes a phase boundary (barrier). Hence adjective movement is allowed in the partitive for these speakers.

In this section, I will review Laenzlinger's account of adjective movement and the split DP (§6.2.1). I will then apply Laenzlinger's tree to the data on the partitive. Using Laenzlinger's structure, I will suggest that children and adults don't always project a complete DP, requiring the adjective that originates in N2 to move to N1. This accounts for why the adult data doesn't fully conform to the predictions of Chapter 3.

6.2.1 Split DP (Laenzlinger 2000)

Laenzlinger argues for adjective movement within the nominal projection to account for pre- and post-nominal adjective patterns in French. He argues for a split DP structure in which semantics and pragmatics correlate with syntactic position (6).

(6)



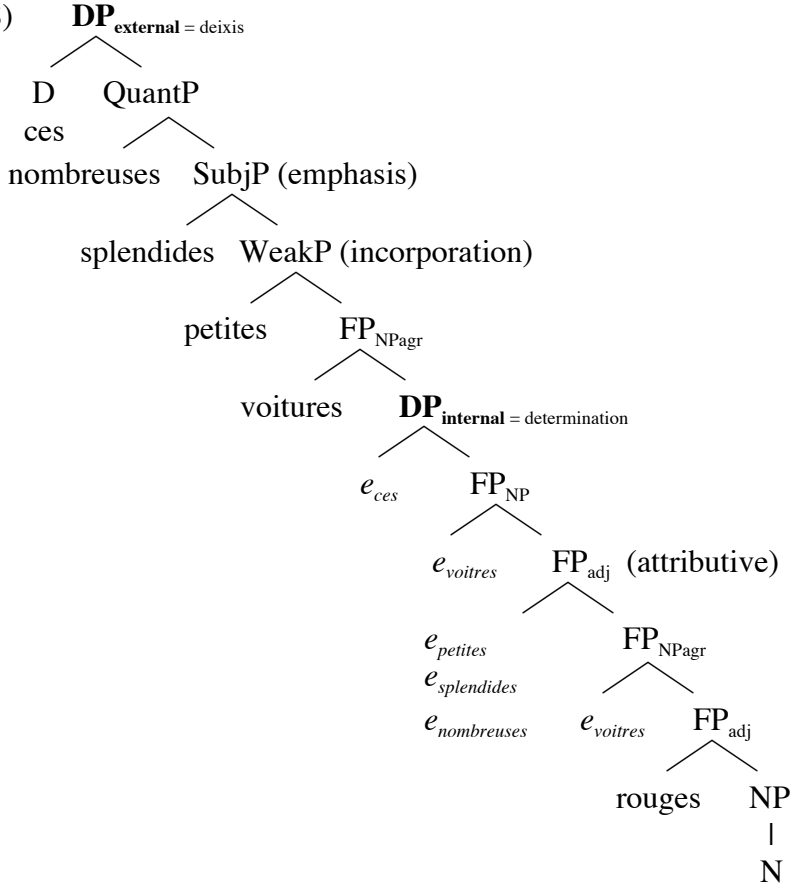
[Laenzlinger 2000: 78]

Laenzlinger's structure contains two DP layers. The higher level, $DP_{external}$, is "the locus of the pragmatic interpretation of the noun phrase and thus can express referentiality, deixis, and so on." The lower layer, $DP_{internal}$, "expresses determination (definiteness, indefiniteness, partitivity, and so on), looking downward at the lexical properties of the noun" (Laenzlinger

2000: 76). Laenzlinger has a number of FP_{NP} positions to accommodate the movement of NP within the structure. He claims that in French the determiner, noun and adjective merge in the $DP_{internal}$ domain and then move to $DP_{external}$ to check strong semantic features. French attributive adjectives don't have strong features so they are left behind and appear postnominally, moving covertly at LF. This movement is illustrated by the tree (8) of the phrase in (7).

(7) ces nombreuses superbes petites voitures rouges
these numerous wonderful small cars red
"these numerous wonderful small red cars"

(8)



[Laenzlinger 2000: 78]

Laenzlinger treats both DPs as phases. For the purposes of the analysis below, I assume that $DP_{internal}$ is not a phase (i.e. not a barrier to movement). Adjectives appear to be free to move between the two DP levels in Laenzlinger's data (assuming the movement is syntactically motivated). However, adjectives never move out of $DP_{external}$. Hence, I claim that only $DP_{external}$ is a phase. I remind the reader that the phasehood of DP in general is currently the subject of debate. Those who lean toward an analysis that DP is a phase usually suggest that some semantic feature, like specificity or referentiality is what triggers projection of that phase (Matushansky, p.c.). Laenzlinger places these features in $DP_{external}$. It may be that the distinction between "strong" and "weak" DPs (see for example Carlson et al 2006) hinges on whether $DP_{external}$ is projected or not.

6.2.2 Lack of $DP_{external}$ Allows Movement Between NPs

Laenzlinger (2000) does not give a close treatment of English DPs. He suggests that adjectives in English are almost exclusively prenominal because determiners and nouns never move out of $DP_{internal}$. I claim that English adjectives don't appear postnominally because determiners, nouns and adjectives either all move together or all stay in situ –except in certain situations which will be described below. If the determiner and the noun move, the adjective must move, too. Below I will describe how the adjective might move and leave its NP behind.

English adjectives move from $DP_{internal}$ to $DP_{external}$ to check semantic features or for pragmatic reasons such as focus. Determiners and nouns move up for pragmatic reasons as well. $DP_{external}$ is the locus of referentiality, etc. In this analysis I claim that English DPs obey the following rule of economy.

(9) **DP Economy:** Syntax is conservative. If strong features don't need to be checked, then $DP_{external}$ is not projected.

For example, $DP_{external}$ is projected in the (underlined) phrase in (10), but not in (11).

(10) Do you like this mug? No, I like <u>the sparkly mug</u> that's over there.
$[_{DPext}$ the$_i$ $[_{WeakP}$ sparkly$_k$ $[_{FPnp}$ mug$_m$ $[_{DPint}$ e_i $[_{FPadj}$ e_k $[_{NP}$ e_m]]]]]]

(11) I'd really like <u>a sparkly mug</u> for my birthday.
$[_{DPint}$ a $[_{FPadj}$ sparkly $[_{NP}$ mug]]]]]]

Movement from $DP_{internal}$ to $DP_{external}$ is feature driven. In (10) the determiner is referential, picking out a particular mug, hence it must check referential features in $DP_{external}$. The adjective is also instrumental in picking out the appropriate specific referent.[50] Thus the adjective must also move to $DP_{external}$ to check focus features. In (11), on the other hand, the determiner is non-specific and the adjective is an unfocused attributive.[51] No strong features need to be checked, and everything remains in situ.

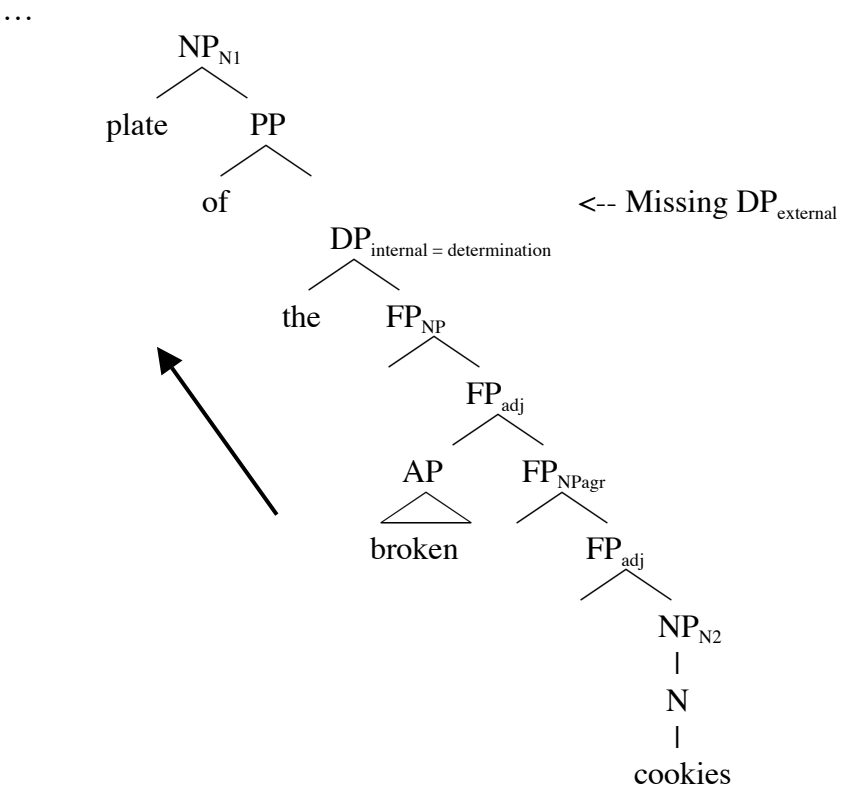
[50] Jill de Villiers (pc) points out that the adjective in (10), as opposed to (11), is likely to be stressed. This is also indicative of a need to move to check focus features.

[51] In (11) the adjective is denoting a kind. It restricts the denotation of mug, but does not provide any referential information that merits the projection of higher DP layers.

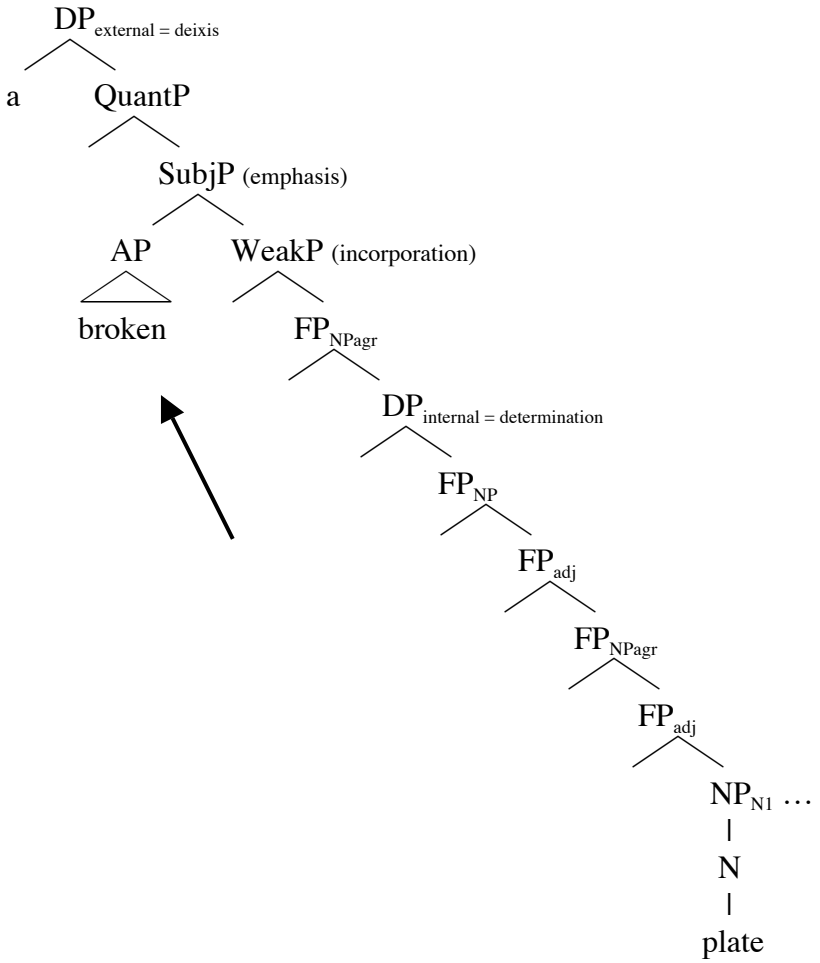
6.2.3 Experimental Results: Incomplete DP in the Partitive

The analysis in §6.2.2 can account for the data in this study, namely partitive structures in which the adjective is adjacent to N1 but modifying N2. According to DP Economy (9), if the semantic content of DP is not "strong" (expressing referentiality/deixis/etc), then the $DP_{external}$ layer is not projected. We could imagine that if N2 were lacking a $DP_{external}$ and the adjective needed to check strong features (12), it would be forced to move up to the $DP_{external}$ of N1 in order to do so (13). This adjective would be permitted to move out of N2 because $DP_{internal}$ is not a phase and does not block movement. The adjective would appear adjacent to N1 in surface structure, but would be reconstructed at LF as modifying N2.

(12) (partitive N2)



(13) moves up to… (partitive N1)



In the analysis above, pragmatics/semantics entirely determines whether $DP_{external}$ is projected. Pragmatics/semantics also determine what features are assigned to the lexical items in $DP_{internal}$, which in turn trigger movement from $DP_{internal}$ to $DP_{external}$. In §6.2.3.1, I will explain how the experimental situation presented to subjects in the "The", "With" and DP Experiments, contained a pragmatic situation in which N2's $DP_{external}$ might not be projected, but might give rise to the adjective in N2 containing strong features. This adjective would be forced to move beyond N2 to get its features checked.[52]

[52] It has been noted that the higher DP in the partitive does contain a $DP_{external}$ level, despite the determiner being indefinite (13). I suggest that the experimental context implies referentiality for the head of the construction,

6.2.3.1 Experimental Situation Revisited

Let us assume here, that some speakers have a restricted version of DP Economy (9). For these speakers, it is the determiner that triggers the projection of $DP_{external}$. The pragmatic features (e.g. referentiality, focus, etc.) of the adjective and the noun do not have the same properties. The experimental story presented in Chapter 5 is about a set of cookies (see Appendix B for the other nine stories). Those cookies end up in smaller sets on plates. The subject is presented with a picture of three plates containing cookies, two of which have an association with the adjective "broken". In one, the plate (which corresponds to N1) is broken, in the other, the cookies (which correspond to N2) are broken. The cookies are presented as a set at the beginning and the subsets of cookies are never individually salient or relevant in the story, they just happen to be how the larger set of cookies was partitioned. After seeing the picture of the plates piled with cookies, the subject is asked to make a picture choice based on one of the prompts in (14).

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which in the case of the partitive is N1. The specific indefinite, "a", then projects $DP_{external}$ because it is relevant to picking out a particular entity in the experiment (see also §6.2.3.1).

(14) a. a broken plate of cookies

b. a broken plate with cookies

c. a broken plate of the cookies

d. a broken plate of those cookies

e. a broken plate of her cookies

f. a broken plate of the mom's cookies

In (14), the determiner is never relevant for picking out the appropriate subset of cookies. All determiners (14c-f) refer to the larger set of cookies originally presented at the beginning of the story. Clearly, the determiner is referring to a particular set of cookies, but this is not new or relevant information for the hearer. Because the determiner is not relevant for the choice (among three pictures) that the subject is being asked to make, it is not automatically given "strong" pragmatic features (which give rise to strong features which must be checked by movement). For those subjects who don't assign the determiner pragmatic features, N2 will lack the $DP_{external}$ layer.

The reader may ask why, if the external DP encodes referentiality, the referentiality of the determiner (referring to the larger set of cookies) does not trigger the full DP structure. I suggest that "the cookies" gets processed like "the newspaper" (Weak Definite – see Chapter 2, §3). The focus of the subject is on the adjective, as it is relevant for the task at hand, and the referentiality of the determiner is lost.

While N2's determiner is not relevant for making a picture choice, the adjective is. The subject's cue for picture choice is the adjective "broken." The adjective is given pragmatic focus features. The adjective "broken" tells us which set of cookies to pick. The subject hears a partitive structure and projects a partitive structure. The pragmatic situation, however, has not given him reason to project $DP_{external}$, and, due to his restricted version of DP Economy (9), he will not project it. This leaves open two possible parses. The adjective could have originated in N1 or N2 because an adjective originating in N2 will have moved to N1 to check features and it is not prevented from doing so. The adjective can move out of N2, despite it being a DP because $DP_{internal}$ is not a phase and hence not a barrier to movement.

Because of the availability of two different parses, the hearer must rely on some other pragmatic decision making process for interpreting the adjective. I will not elaborate here on what that interpretive process might be. I only suggest that there is ambiguity in the representation of DP due to pragmatic interpretation. It is also possible that the process of choosing a parse will also be affected by a preference for the adjective modifying the noun that it is adjacent to. This process may also be subject to dialectical differences. It may be that some speakers *always* project $DP_{external}$, ruling out the N2 parse for the adjective.

6.2.3.2 Pseudopartitive Items

How does this syntactic process interact with the pseudopartitive structure? Remember, the pseudopartitive is a single nominal projection. Adjectives may have multiple positions within

the NP, but any adjective within the pseudopartitive nominal projection is going to modify N2. In fact, it will either modify N2 or it will modify both N1 and N2. See §3.3 for discussion of adjectival modification of N1 and N1-headed pseudopartitives.

It would be interesting to analyze where the pseudopartitive's Measure Phrase might appear in a split-DP structure of the sort in Laenzlinger 2000. A proper treatment of this aspect of pseudopartitive syntax is beyond the scope of this dissertation. It is important to point out, however, that in the pragmatic account that I propose above, the adjective must move up to check focus features. This might imply that phrases like (15) shouldn't exist because the adjective must move higher to check features.

(15) a plate of broken cookies

In light of adjective movement, however, phrases like (15) *must* exist to clarify a situation when it is *just* the cookies (and not also the plate) that are broken. I assume that the construction in (15) can use covert movement to check focus features and that the rest of the time this construction remains unfocused, with all lexical items remaining in $DP_{internal}$ (See §6.2.2). It is in support of the focus feature checking analysis that I mention that across the three follow-up experiments 25 subjects erred at least once on the control items (15) by modifying N1.[53] This is not an extremely robust phenomenon, but if it could be replicated

[53] This response pattern was exhibited as follows. The "The" Experiment, eight subjects: three 3 year olds, two 4 year olds, two 5 year olds and one adult; The "With" Experiment, six subjects: two 3 year olds, two 4 year olds, one 5 and one 6 year old; The DP Experiment, eleven subjects: three 3 year olds, two 4 year olds, one 5 year old, three 6 year olds and two adults.

and found reliable, it would lend support to the idea that the adjective moves within the DP (perhaps in this case with Backward Raising, Polinsky 2008).

6.2.3.3 Adjunct "With" Items

Complex noun phrases with adjunct "with" do not need to be addressed in terms of DP Economy. The reason the adjective cannot move from N2 to N1 is because N2 is in an adjunct position. The adjective in N1 does not c-command N2. Adjectives cannot move nor modify from one NP to the other. Children who have trouble with these items are exhibiting attachment issues that are beyond the scope of this dissertation.

6.2.4 Acquisition of the Split DP

In §6.2.3 I explained how the adult grammar might allow for an adjective to move from N2 to N1 in the partitive if the determiner is interpreted as pragmatically "weak". Using the split DP structure of Laenzlinger 2000, I suggest that the adjective must move to $DP_{external}$ to check focus features. However, I suggest that in some cases, when the hearer does not encode the partitive DP with strong features, it lacks $DP_{external}$ and the adjective must move up to the higher DP for feature checking. This results in a structure where the adjective is adjacent to N1, but interpreted as modifying N2. The experimental data shows that children allow this movement more often than do adults. Why is this the case?

First of all, children are more pragmatically oriented than adults (Kupisch 2005). Additionally, children have a bottom-up approach to acquiring phrases (Roeper 2006 interalia). Roeper 2006 claims that children start out with basic lexical structure and build up. The law of DP Economy ensures that children and adults are conservative. Children will not project $DP_{external}$ until they are able to recognize the pragmatic, and/or semantic features that require it. Hence, a child would start out with only an NP and then, with time and evidence, project $DP_{internal}$ and eventually $DP_{external}$. This means that they start out in a state where the adjective is free to move wherever it wants. The lack of $DP_{external}$ means a lack of a barrier to movement.

Due to the bottom-up approach, children begin mastering the semantic and pragmatic features of the $DP_{external}$ around age 5 or 6 (see for example Maratsos 1976, Schafer & de Villiers 2000 and Matthewson, Roeper & Bryant 2001). Hence, we shouldn't see mastery of barriers until around this age. This prediction has implications for the acquisition of all contexts where DP creates a barrier (e.g. extraction from relative clauses). I discuss these implications further in §6.5.

A child who lacks $DP_{external}$ may not move the adjective up in his own production because he has no place to check strong features. However, he will be aware (due to UG) that movement can take place. The experimentation in this dissertation involves language comprehension. A child hearing an adjective adjacent to N1 with no DP structure to prevent it having moved

may be even more likely than a pragmatically biased adult to interpret the adjective as referring to N2.

We can see children's results trending in this direction. Across the board, with all experiments, younger children are freer in their adjectival interpretation than either the older children or the adults. These children are not clear on where the adjective belongs because they are lacking the higher syntactic structure to constrain it and rely on pragmatics to determine what the adjective is modifying.

This analysis really only relates to comprehension. It may actually predict the opposite data for child production. A child producing partitives may *never* produce an adjective next to N1 and have it modify N2. If the child is lacking $DP_{external}$ then he won't have any motivation to move an adjective originating in N2. There would be no place yet to check strong features. Thus the child may only be able to have the adjective modify within its own NP because he has no motivation for movement.[54]

As children grow into adulthood, speakers rely less on pragmatics and more on standardized syntactic structures. In the adult grammar of partitive interpretation, a number of factors are battling. Adults are balancing pragmatic interpretation, a standardized partitive structure, the option for a reduced DP in the partitive, economy, and a preference for adjacent modification.

[54] There exists an alternate analysis in which adjectives modify by c-command and are blocked from modifying by the existence of the DP barrier. The analysis involves no movement and predicts that children would be just as free to modify in production as in comprehension. Production studies are needed to differentiate between these two analyses.

Table 6.1 shows what options are available depending on interpretation strategy for the partitives in (14c-f).

Influences on interpretation	**Modify N1**	**Modify N2**
(a) Standardized partitive (N2 has DP_{ext})	Y	N
(b) Preference for adjacent modification	Y	N
(c) Default DP contains DP_{ext}	Y	N
(d) Default DP lacks DP_{ext}	Y	Y
(e) Economy: N2 lacks DP_{ext}	Y	Y
(f) Pragmatics: N2 lacks DP_{ext}	Y	Y

Table 6.1: Possible Interpretation Strategies in the Adult Grammar.

If we assume that adults must use a strategy to parse the partitive (see below), all of the factors Table 6.1 potentially affect adult's strategy for interpretation. It may be the case that these factors are ranked in strength for each speaker (and perhaps for each construction or utterance) as in Optimality Theory (Prince & Smolensky 1993). I suggest that children are more likely to under represent the DP in the partitive, and that the strength of each factor to effecting interpretation is different (or differently ranked) than for the adults. As children mature, and gain more evidence of the properties of the English DP, the balance of these factors shifts.

I also suggest that different adults may have different rankings of the factors in Table 6.1. In talking to various people (linguists and non-linguists alike), about these structures and my experimental results, I have received one of three responses a) head nodding, b) shock that an adjective can EVER modify N2, c) shock that I think adults could constrain the adjective to only modifying N1 regardless of situation. This split in adult responses gives one pause to wonder about partitives of the sort discussed in this dissertation –those that are minimal pairs with pseudopartitives. They are rare enough that in my conversations with other syntacticians I am often met with a judgment of ungrammaticality if I provide these phrases without context. Let's return to two of the sub-hypotheses mentioned in §6.1.6.

$H3a_{dp}$: Once children have mastered a range of constructions containing DP in English, they will begin to project a full DP as the default when encountering new constructions. This is the adult grammar/strategy.

$H3b_{dp}$: Regardless of how many DP-containing structures the child encounters, he will continue to project the minimal DP as the default when encountering new constructions. This is the adult grammar/strategy.

If the partitives discussed herein are rare (a comprehensive study needs to be done), they may provide precisely the environment that gives rise to a default DP. Let's focus here on the definite determiner "the." Imagine that children begin the acquisition process with a minimal structure for determiners (Roeper 2006 interalia). They will quickly learn that some instances of "the" contain many semantic features and some contain few (Chapter 2). This necessitates learning which syntactic structures in English contain which sort of definite determiner. As

the acquisition process progresses, the child will continue to encounter novel DP contexts although they will arise less frequently.

At the point when novel DP contexts drops below a certain frequency the acquisition device will rely on a default strategy. There are two options for this strategy: a) use the default that has been in place from the beginning (i.e. projecting minimal DPs) or b) base the strategy on the majority of the DPs in the language (which I assume means projecting maximal DPs, although a definitive statement requires a frequency analysis of the interaction of the semantics, pragmatics and syntax of the English DP). It may be the case that the majority of English speakers reach adulthood with the default strategy of projecting a maximal DP, while 25% or so keep the childhood strategy of projecting minimal structure in new contexts.

The analysis I have just presented is speculative, but it acknowledges that the proportion of adults who pattern with the children in the study is large enough to warrant more than being called pure error (See also §2.3). Further research on adult comprehension of partitives is needed. I return to the concept of DP ambiguity in §6.5.

6.3 An Alternate Analysis: Headedness

I have shared the analysis in 6.2 with some colleagues[55] who have suggested that the experimental results may not be due to a weak determiner in the partitive, but rather due to

[55] Among them most notably William Snyder and Jonathan Bobaljik, UConn.

the partitive itself being ambiguous regarding which noun is its head. These colleagues claim that N2 is always available for adjectival modification. However, I have spoken with other colleagues[56] who can *never* get the reading in which N2 is modified by an adjective preceding N1 (even for the pseudopartitive). This mirrors the split in the adult data (discussed above and in Chapter 5). Half of the adults in the experiments above never get a reading where N2 is modified. I turn now to an alternate analysis, namely that the partitive is ambiguous in whether N1 or N2 is the head of the construction.

6.3.1 N2-Headed Partitives

The benefit of suggesting that the partitive has two structures is that it easily accounts for the fact that s-selection data suggests that N2 is sometimes the head of the partitive structure (16). It also accounts for agreement phenomena such as (17).

(16) I drank a bottle of that wine.

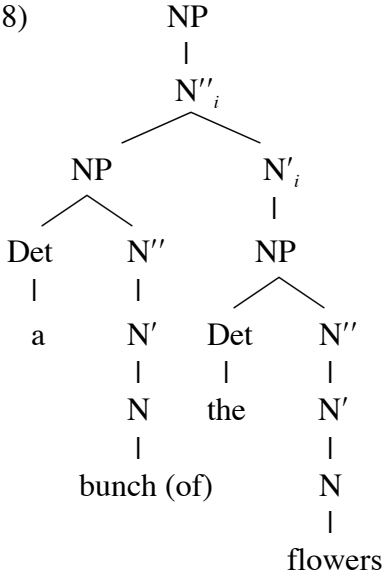
(17) A large proportion/number of the adults <u>are</u> choosing to attend the dance rather than go to a bar.[57]

As mentioned in §3.2.1.1, Selkirk 1977 proposes second N2-headed structure (18) for the partitive to account for just such data as in (16-17).

[56] Most notably Richard Kayne, NYU.

[57] Interestingly enough, the spelling/grammar checker on my computer questions the number agreement of this verb, but I find "is" in this case to be quite odd.

(18) [the N2-headed partitive]



The account is not clearly worked out and her trees are difficult to translate into modern syntax, leaving no node for "of" and placing N1 in a specifier position.[58] Nevertheless, it reinforces the validity of investigating an approach that posits the option of N2-headed partitives.

In §6.3.2 I will discuss how an N2-headed partitive (alongside the standard N1-headed one) would account for the data and what sort of form that N2-headed partitive might take. In §6.3.3 I will discuss how a headedness account might deal with N2's determiner. In §6.3.4 I will discuss children's acquisition of the partitive in light of headedness ambiguity.

[58] When accounting for adjectives modifying N2, placing N1 in a specifier position is problematic. An adjective that appears adjacent to N1 will not c-command N2 (nor will N2 c-command N1). If we assume that a c-command relation is necessary for modification and movement, then we have lost the original purpose of positing an N2-headed partitive; namely to account for the adjective modifying N2. Additionally, we are left lacking a node for "of". Selkirk in her account, left "of" floating as something inserted at the level of PF.

6.3.2 How Does N2-Headedness Account for the Data?

Positing an N2-headed partitive is another way of accounting for the data in the Pilot Experiment and three follow-up experiments. If we have two partitive structures, one headed by N1 and one headed by N2, then we only need assume that the child is choosing one of these representations and interpreting the adjective as modifying the head of that construction. This account does have trouble when addressing those speakers who interpret *both* N1 and N2 as being modified (see chapter 4).[59] It also may run into trouble in terms of economy, requiring children to keep two representations in their head and choose between them (see §6.3.4), but this analysis is worth exploring nonetheless.

If children have a greater likelihood of interpreting the rightmost nominal item in a complex noun phrase as the head, what does this say about acquisition of nouns overall? This may reflect a strategy that acknowledges rightward branching, but what does it say about children's analysis of the material above N2? Is it easier for children to project functional structure than it is for them to project lexical structure? If children assume both N1 and N2 are nouns, do they interpret the entire construction as some sort of compound or does N1 go in a specifier somewhere as in Selkirk's (1977) tree? I will explore these options below.

[59] Although this point may not be relevant, depending on whether we believe "both" responses to be a valid syntactic option (See §3.4).

6.3.2.1 Why Would an N2-Headed Partitive be Chosen?

Why would an adult, hearing a partitive structure, choose to represent it in his mental representation as headed by N2? We must assume that headedness is selected by the pragmatic interpretation of what the phrase refers to. This means that the subject is listening to the story and deciding that "cookies" is the topic, hence "a broken plate of those cookies" is headed by N2. The use of a demonstrative or a possessive would suggest that "cookies" is the relevant information, but it is also precisely the acknowledgement of the determiner that should lead the hearer to assume that N2 cannot possibly be the head of the entire construction. If the determiner is deemed relevant, it cannot possibly be ignored and hence must be projected fully, with strong features ($DP_{external}$). DP should then demark the limit of the nominal projection. This analysis would then *prevent* the adjective adjacent to N1 from reaching N2.

Let us then examine the opposite approach. In §6.2.3.1 I argued that the experimental situation could cause a *de*-emphasis of DP. The use of the determiner/possessive is never relevant/interesting/new contextual information. This would suggest an N2-headed analysis in which the determiner is not a full DP. Perhaps the lack of strong DP triggers the reanalysis of partitive as pseudopartitive. This analysis is supported by the work of Rutkowski (2007), who claims that the pseudopartitive emerged diachronically as a grammaticalized partitive.

Roberts & Roussou (1999) claim that diachronic change occurs because the "parameter-setting device" (UG) is computationally conservative, with a preference for simpler

representations. They claim that functional projections are more economical than lexical ones. Rutkowski (2007) claims that the pseudopartitive structure is the result of diachronic grammaticalization of the partitive. He claims that over time the reduced structure of the pseudopartitive is preferred for partitives in which reference to a specific set is not needed by the discourse. The pseudopartitive is preferential because it involves a single noun dominated by functional material. The partitive is bi-phrasal, containing two DPs, and is, as a result, more costly. This analysis suggests that the parser is going to prefer a pseudopartitive to a partitive unless there is sufficient semantic/pragmatic evidence that a partitive structure is required.

6.3.3 N2-Headed Partitive Structure

There are a number of forms that an N2-headed partitive might take. All of them require an account of the lexical/functional status of N1. All of them also require a reanalysis of DP, which would normally mark the edge of the nominal projection. Can determiners sometimes be reanalyzed as adjectives? Or as some sort of weaker functional projection? Both of these possibilities would be consistent with the fact that DP is not always a barrier to movement/modification. Additionally it would explain the fact that DP behaves erratically with phasehood diagnostics (Matushansky 2005). I will outline two possible analyses below, a single nominal projection using Laenzlinger's DP (§6.3.3.1) and partitive as pseudopartitive (6.3.3.2). Both of these analyses require a reanalysis of the determiner that precedes N2. I will discuss three options for reanalysis of DP: determiner as adjective

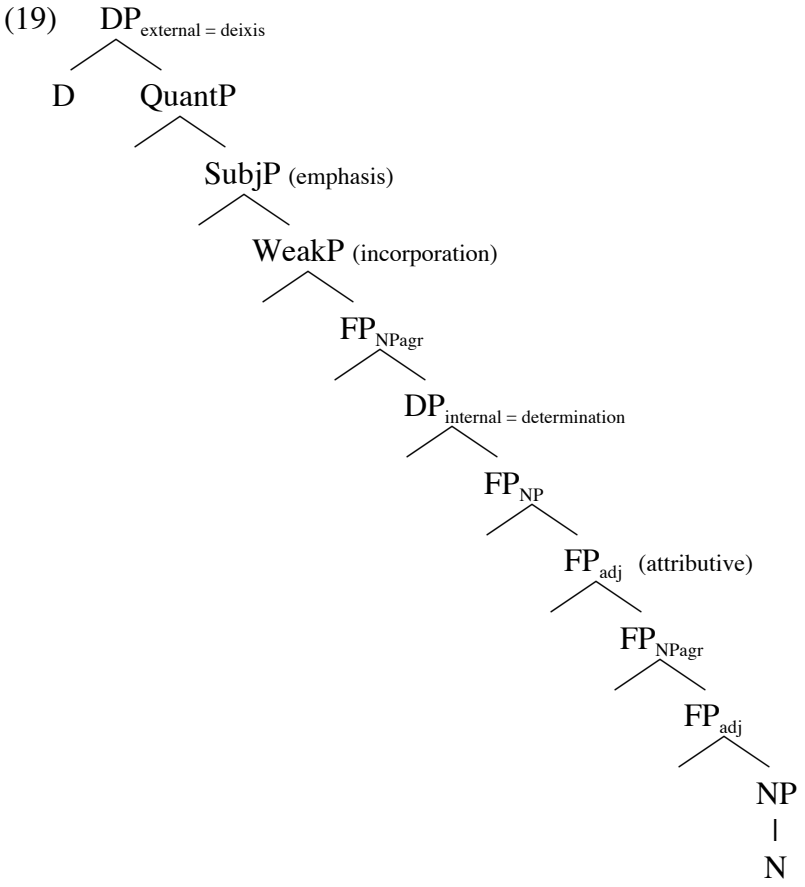
(6.3.3.3), determiner in specifier (6.3.3.4) and deletion of determiner (6.3.3.5). All of these options make predictions that can be addressed by future research.

6.3.3.1 Reanalysis of N1 Domain as Functional (Laenzlinger)

If the partitive is headed by N2 and we assume that N1 is not in a specifier position (as proposed by Selkirk 1977), it must be the case that N1 is reanalyzed as functional (or semi-functional) material. The most likely option is that N1 is a Measure Phrase in these cases. If we imagine that N1 is an MP, then the adjective might be base generated above N1 and modify the head from that position. If the partitive's N1 can be a measure phrase, this calls for a reanalysis of N2's DP. This DP should still block an adjective from modifying N2, but clearly it doesn't. Additionally, MPs do not take DPs as their complements (Chapter 3, §3.2.3.3), nor is DP usually dominated by other material in a single nominal projection. This suggests that the definite article in N2-headed partitives is not a (complete) DP.

If we look back at the DP structure as defined by Laenzlinger, (19), we see that Measure items are in the $DP_{external}$ domain.

(19)



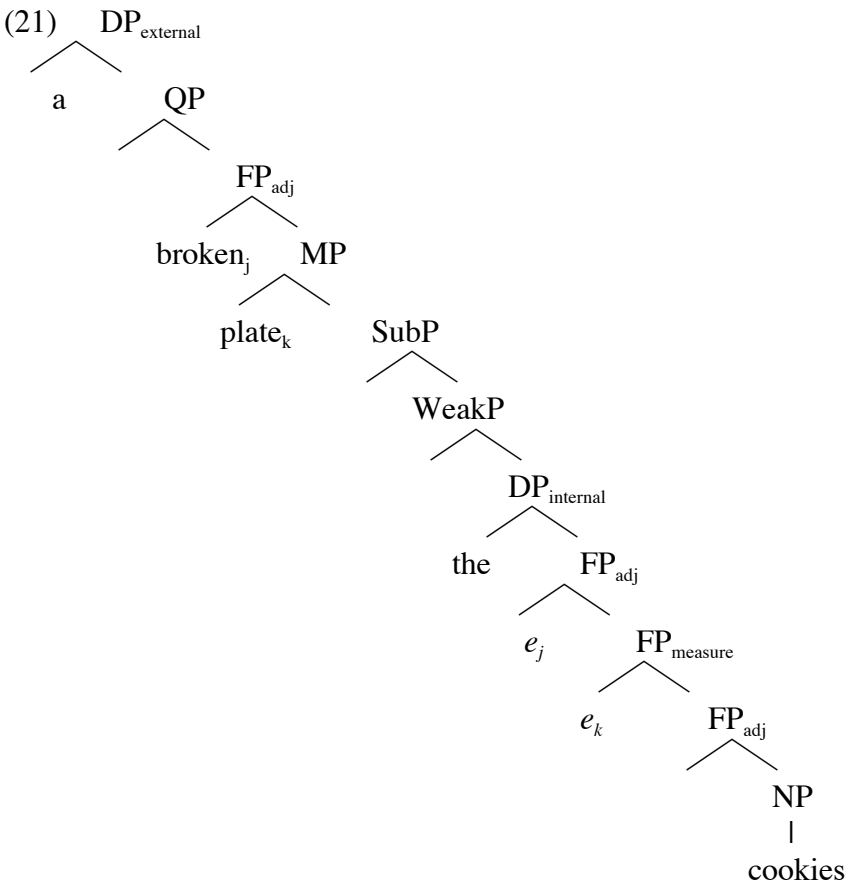
Laenzlinger puts measures in QP. I suggest that they should appear in a phrase a couple of nodes down from QP (20).

(20) $[_{QP}$ Every $[_{AP}$ sweet $[_{MP}$ cup $[_{FP}$ of $[_{NP}$ tea]]]]]

Laenzlinger claims that all adjectives are base generated in the domain of $DP_{internal}$ and then move up to the domain of $DP_{external}$ along with the determiner and the noun. Fitting an entire "partitive" into the above structure is a bit tricky. It requires the addition of an MP node in the $DP_{external}$ domain. If one imagined that the MP and adjective moved, but the determiner and noun stayed behind, it is possible to get the correct word order for the partitive. If N1's

determiner is merged at the end of the cycle (rather than moving up from N2 and the $DP_{internal}$ domain) we are left only needing to account for where "of" goes (21).

(21)



Beyond the lack of a node for "of", this tree lacks motivation. Why would the adjective and the MP move but not the DP and the NP? Clearly N2's DP no longer has a place to move to (the $DP_{external}$ node is filled with N1's DP), but the syntactic/semantic motivation for the creation of this structure is unclear. I will not theorize further on this option. Its speculative nature does not make it a viable explanation.

If the structure in (21) could be motivated, however, it predicts that extraction of low-attached modifiers will still be blocked (for both N1 and N2 headed partitive structures, due to the existence of the dominating DP. However, the "of"-phrase should not be able to extrapose from an N2-headed partitive because "of cookies" will no longer be a PP. Thus, a semantic/pragmatic situation in which extraposition of a low-attached modifier (22) and extraposition of the "of phrase" (23) are *both* ungrammatical would be evidence for the structure in (21).

(22) *A number of John's questions were asked concerning electromagnetism.

(23) A whole box was eaten of those scrumptious cookies.

It is clearly the case that trying to cram an entire partitive structure into a standard single nominal projection will not be easy to execute or motivate. But what about a non-standard single nominal projection? Selkirk (1977), in addressing the possibility of an N2-headed partitive, suggested a partitive that had parallel structure to the pseudopartitive. In Selkirk's case, this involved putting N1 in a specifier position. While putting N1 in a specifier is not an optimal analysis, fitting the partitive into a pseudopartitive structure may be plausible. See §6.3.3.4 for a brief discussion of why putting N1 in a specifier position causes difficulty. In the following section I will discuss the reanalysis of partitives as pseudopartitives.

6.3.3.2 Partitive as Pseudopartitive?

As mentioned in §6.3.2, Rutkowski 2007 analyzes the pseudopartitive as a grammaticalized partitive. Rutkowski claims that the pseudopartitive has evolved to take the place of those partitives that are lacking in semantic content. Specifically, he argues, that the pseudopartitive evolves in languages to accommodate partitives that are not referential. The single nominal projection is more economical than one that is bi-phrasal. He cites diachronic evidence of languages transitioning from a language containing only partitives to one that contains both partitives and pseudopartitives. He suggests that during the transitional period many partitives may be ambiguous between a partitive and a pseudopartitive structure. This then may be the solution to the problem of an N2-headed partitive. It fits with Selkirk's idea of making an N2-headed partitive look like the pseudopartitive and corroborates the idea that partitives may be ambiguous as to their structure.

What would a partitive look like if it were analyzed as pseudopartitive? Rutkowski suggests a complete deletion of structure (24). The partitive N1 moves from NP to MP, middle structure is deleted and a single nominal projection emerges.

(24) $[_{DP}$ a $[_{MP}$ box$_i$ ~~$[_{NP}$ e_i $[_{PP}$ of $[_{DP}$ your $[_{MP}$~~ $[_{NP}$ cookies~~$]]]]]]$~~

Unfortunately analysis in (24) creates a pseudopartitive that lacks "of", such as in Dutch (25).

(25) [$_{DP}$ een [$_{MP}$ doos [$_{NP}$ koekjes]]]
a box cookies
"*a box of cookies*"

In order to create English pseudopartitives, "of" must move as well as N1 (26).

(26) [$_{DP}$ a [$_{MP}$ box$_i$ [$_{FP}$ of$_j$ ~~[$_{NP}$ *e$_i$* [$_{PP}$ *e$_j$* [$_{DP}$ your [$_{MP}$~~ [$_{NP}$ cookies]~~]]]]~~]]]

Rutkowski's analysis accounts for diachronic change. At first glance, this is a compelling analysis for the variation in the adult grammar. Not only does it allow for partitives that are treated as if they were syntactically pseudopartitive, but it also allows for inter- and intra-speaker variation on partitive items. However, this analysis is not ideal because DP is deleted entirely. This means that the article/possessive will be dropped from the speaker's representation. Does this mean that the article is completely ignored by an adult who treats partitive as pseudopartitive? This analysis also predicts that in situations (different from my experimental ones) where the semantic information in DP2 is relevant the hearer either will be prevented from deleting structure or will not be able to encode that semantic information.

Of the eight adults who spontaneously repeated some part of the partitive prompt during the three follow up experiments, two deleted the article (27a-b) and one inserted a stronger preposition (27c).

(27) a. “round can of stones” (prompt: “round can of those stones”)

b. “clean bowl of peaches” (prompt: “clean bowl of those peaches)

c. “hairy plate with the worms” (prompt “hairy plate of the worms”)

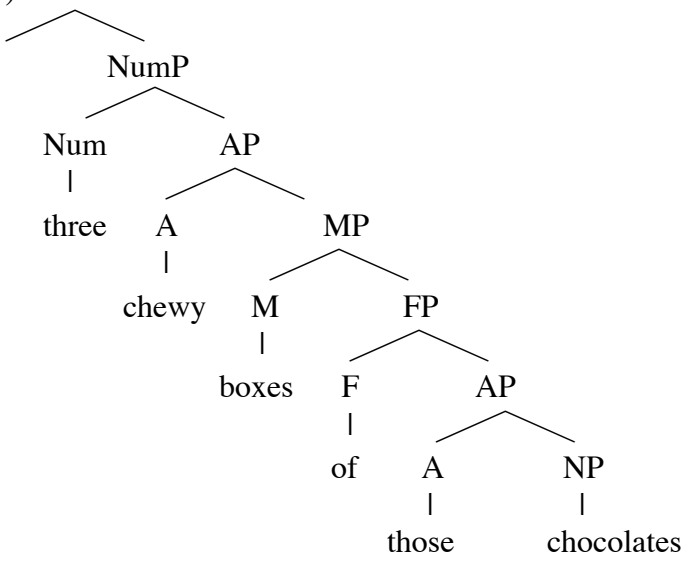
Because repetition of the prompt was not a part of the task, we cannot draw any concrete conclusions from three sample utterances, but it is worthy of future experimentation. It is unclear whether deletion of the determiner is an option of the adult English grammar or not. If we assume the determiner is somehow saved from deletion in the representation of these reduced partitives we must account for their existence in a non-DP structure. This is the same dilemma we have with all N2-headed partitives.

6.3.3.3 Reanalysis of the Determiner

How do we reanalyze the material in D so that it is consistent with an N2-headed partitive analysis? In §6.3.3.1, I proposed an analysis in which the determiner appears in some D-like structure in an N2-headed partitive, but it does not have all of the properties of a full DP. I attempted this analysis using Laenzlinger’s split DP structure. The syntactic result was rather unwieldy –lacking a position for “of” and generally lacking motivation for the existence of the structure. An analysis in which the partitive is treated as a pseudopartitive is much more elegant syntactically, but we are still left needing to account for the determiner. Ideally we want to be able to place the determiner in already existing structure (like a specifier position) or have it reanalyzed as the head of an already existing projection. There are numerous

adjective positions in the nominal projection. I examine here an analysis in which the determiner is reanalyzed as adjectival (28). This analysis is also suggested in Ramos 2000 as a possible strategy for children who misinterpret phrases like "that bear's balloon." Ramos suggests the demonstrative may be projected as an Adjective Phrase.

(28) DP "three chewy boxes of those chocolates"



The determiner in (28) fits seamlessly into the syntactic tree as an adjective. Reanalysis of determiners as adjectives fits best with the assertions I have made about the pseudopartitive, the partitive and how MP and FP work (Chapter 3). FP is not selecting for a DP, it is selecting for an NP that happens to have an adjective above it. This analysis is structurally ideal because it does not impose any new nodes or movement that must be motivated.

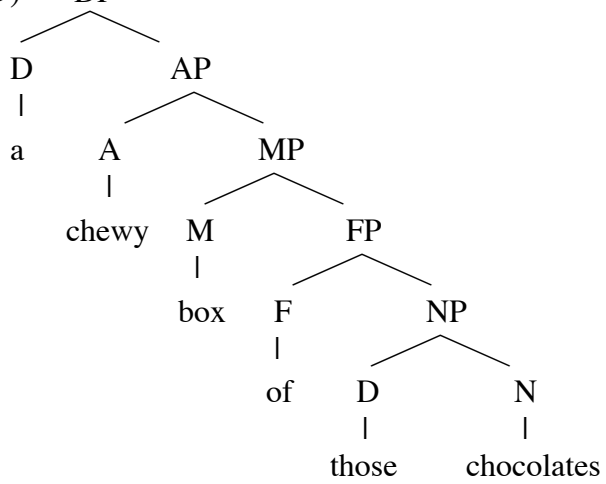
But what does it mean for the determiner to be reanalyzed as an adjective? This is certain to have semantic consequences. To reanalyze "the", demonstratives and possessives as adjectives implies loss of semantic features, such as referentiality. However, I claim that this reanalysis comes about precisely because referentiality is not encoded on the determiner.

Like determiners, however, adjectives are capable of referring to discourse or world knowledge (e.g. the adjective "former"). It is not clear how a determiner "the" would differ from an adjective "the," but there should be predictable differences that can be tested.

Although, this looks promising, it isn't clear to me how to go about testing to see if a determiner has been reprocessed into an adjective. In terms of the syntax of a reduced partitive (i.e. pseudopartitive) this works exceptionally well. Whether it is truly a viable option is left to future research. I cannot take this option off the table, but neither can I argue strongly for it without further analysis of adjectives and psycholinguistic testing of adult English speakers.

Another option is for the determiner to be put in the specifier of NP (de Villiers & Roeper 1995, Schafer & de Villiers 2000). This would allow a pseudopartitive structure with a determiner (29).

29) "a chewy box of those chocolates"



As with reanalyzing the determiner as an adjective, putting the determiner in the specifier of NP should have testable syntactic ramifications.

A definitive conclusion in this area is beyond the scope of this dissertation. I mention the two potential analyses above to show that it is indeed possible to create a pseudopartitive that has an article appearing between N1 and N2, but no DP to create a barrier to movement/modificaton. This validates Rutkowski's approach to the diachronic development of the pseudopartitive, which in turn gives validity to the data of those English-speaking adults who treat the partitive as if it were pseudopartitive. When more research has been done on the adult processing of partitives that are minimal pairs with pseudopartitives, the correct analysis may become clear.

Regardless, analyzing the children's behavior on the experiments in Chapters 4 & 5 as resulting from a reanalysis of partitive as pseudopartitive is much more elegant than trying to create an N2-headed partitive using Laenzlinger's extended DP. But why would a child (or an adult) opt to project a pseudopartitive rather than a partitive when the input is a partitive?

6.3.4 Headedness and Acquisition: Why Preference for N2?

Given the analyses above, why would children be more likely to analyze N2 as the head of the partitive than would adults? I will discuss acquisition in terms of reanalysis-as-

pseudopartitive because that seems to be the most likely option for an N2-headed partitive analysis.

I mentioned in §6.3.3.2 that Rutkowski 2007 claims that the pseudopartitive is a grammaticalized form of the partitive that emerges diachronically in languages. If diachronic development is guided by the principles of UG, then it follows that first language acquisition, which is governed by UG, will exhibit similar processes. Based on the claims that the language faculty prefers economical structures and that the pseudopartitive is more economical than the partitive, it is logical to assume that children will start out building only pseudopartitive structures until they gain evidence that the more costly partitive structure is needed.

Why are children more likely to prefer an analysis with one noun and lots of functional nodes above it, rather than two NPs and fewer functional (more lexical) nodes? Rutkowski (2007) suggests that the pseudopartitive is more economical than the partitive based on the claims of Roberts & Rousseau (1999) that functional projections are more economical than lexical ones and hence preferred by "the parameter-setting device of the language faculty" (Rutkowski 2007: 45). Thus it may just be simpler for children to represent only one noun in their syntactic structure. The choice of the N2-head may also be reinforced by the compound-noun rule that children are acquiring: heads are always the rightmost items in English compound nouns. This rule may get erroneously generalized to "heads are always the rightmost item in complex noun phrases."

Adults, however, may simply be driven by economy. If there is no referentiality in the utterance, default to pseudopartitive is acceptable. Alternately, the English grammar may be in the midst of language change. The partitive, for some adult speakers, may be ambiguous between partitive and pseudopartitive structures. Children can accommodate language change in the input grammar (Lightfoot & Westergaard 2007), but the existence of pseudopartitive-like partitives (or the use of a minimal DP) in the adult grammar of some adults may increase children's tendency to parse the partitive in this way.

6.3.4.1 Acquisition Path: Headedness

If children start out with an N2-headed partitive, it may be because the evidence for most other nominal items points to the head being rightmost (Ramos 2000). So the default for children may be to always project N2 as the head and fit all proceeding material into functional projections, some of which may be underspecified for features. As children gain more evidence for various nodes in nominal projection (e.g. QP and MP), they may recognize that N1 has features that cannot be accounted for by the functional structures they have in place. At which point N1 will be recognized as a noun and structural reanalysis will occur. Carefully refined online experiments might be able to pinpoint this reanalysis phase (in terms, perhaps of reaction time), assuming it lasts for more than a day. The experimental data here suggests that for many children the transitional period may be quite long (extending perhaps, for some, into adulthood).

Another possible trigger for reanalysis of N1 as the head of the partitive may come from the determiner. A headedness analysis requires that N2's DP be reanalyzed as some other node (e.g. AP). If, at some point, children correctly identify this determiner to be a full DP, and they have knowledge that DP should be the edge of the nominal projection (which one assumes is knowledge made available by UG), then they will be forced to reanalyze N1 as a separate noun.

6.3.4.2 Arguments against the N2-headed Hypothesis

Naturalistic data from the CHILDES database (Sachs 1983 & Kuczaj 1976a) show that the partitive and the pseudopartitive appear in children's spontaneous speech at the same time (roughly age 2;6). Reanalysis of partitives as pseudopartitives may be a viable explanation of comprehension data, but it does not hold up when faced with the fact that children are producing partitives at a young age. If children are ignoring the semantic information that requires a determiner to be present (and projecting a pseudopartitive structure), then why would they bother to include it in the structure at all in their production? Reanalysis of partitive as pseudopartitive is an option if they hear lexical material that doesn't fit into the syntactic structures that are available in the child's present grammar, but it seems unlikely that a partitive-like structure would appear early on in the child's production if the child were unable to represent it syntactically.

Although Rutkowski suggests economy is what guides the grammaticalization of partitives, creating pseudopartitives, Chris Potts (p.c.) suggests that for children (or adults) it would not be economical to project two structures and then choose between them. I suggest that with respect to the comprehension data, what we may be seeing is a default strategy, rather than a weighing of two structures. It is plausible that when a young child hears a partitive he automatically projects an N2-headed structure. An N1-headed structure would only be projected if there was sufficient semantic/pragmatic evidence to force a representation in which N1 is the head –and that the N1-headed option would not even be considered unless the N2-headed structure couldn't account for the input. This allows for partitives to be present in production, but less likely in comprehension. As I mentioned in §6.2.3.1, the experimental situation did not include pragmatic information that made relevant whether N1 was the head or N2 was the head (or whether N2 had a full DP). If children are lacking pragmatic information to aid in their decision-making and the N2-headed partitive is their default, then experimentally they should be letting the adjective modify N2 more than 50% of the time. Unfortunately, the data do not support this assertion. Table 6.2[60] shows the percentage of subjects for each age group who interpreted the adjective as modifying N2 on partitive and pseudopartitive items more than 50% of the time, which would be compatible with an N2-headed default analysis.

[60] Table 6.2 covers the data in the DP Experiment and the The Experiment only and does not include the control items for which the correct (and only) answer was to modify N2.

Age	% modifying N2 over 50% of the time
3	11.11%
4	8.33%
5	0.00%
6	14.29%
Adult	4.88%

Table 6.2: Percentage of Subjects Modifying N2 more than 50% of the Time.

If adjectival modification correlates with headedness, then we would expect the adjective to modify N2 far more often in partitive and pseudopartitive items (esp. pseudopartitive for which N2 is arguably usually the head). Clearly this is not the case. When one excludes the pseudopartitive items, the partitive data alone is quite similar (Table 6.3).

Age	% modifying partitive N2 over 50%
3	11.11%
4	16.67%
5	8.33%
6	14.29%
Adult	4.88%

Table 6.3: Percentage of Subjects Modifying N2 more than 50% of the Time – Partitive Items Only.

If adjectival modification is a diagnostic for headedness, then we would expect, on a default N2-head analysis, that children would be opting for the adjective to modify N2 far more often than they do. This is strong evidence against an analysis based on headedness.

6.4 Differentiating Between "Weak" DP and Headedness

The experimental data show that children (and some adults) are not rigid in their interpretation of the partitive. They can allow an adjective to modify N2, an operation that should be blocked by the intervening determiner. The weak DP account and the headedness account both remain intriguing options. The headedness account seems to be ruled out by the data in §6.3.4.2, but it remains a valid hypothesis, which should be tested further.

The weak DP account predicts that N1 will always be projected as the head of the partitive structure, though the adjective may modify N2 if the intervening DP is not properly projected. The headedness account predicts that headedness is variable and that the adjective will modify whatever is projected as the head of the partitive. How might we test for headedness? S-selection is a good place to start. If it is possible to come up with a methodology for testing s-selection and adjectival modification at the same time, then sentences like (30) might point us in the right direction.

(30) Jim smashed a lumpy bowl of that oatmeal.

In (30) the verb "smashed" selects "bowl" (N1) as the head of the construction. If for those subjects who modified low in the experiments in this study, "lumpy" can refer to "oatmeal" (N2) in (30), then the headedness hypothesis should be ruled out.

6.5 Structural Ambiguity in the Partitive

Regardless of whether we assume that children (and some adults) don't reliably project a (full) DP or we assume that children (and some adults) don't reliably project an N1-headed partitive structure, it is still evident that there is a structural ambiguity that children and adults are facing. For most speakers, however, this does not appear to be a completely unguided ambiguity. If there were just two options with nothing to decide between them, we'd expect to see subjects exhibit evidence of guessing. I assume that chance is at roughly 50% for the DP Experiment and the "The" Experiment.[61] Table 6.4 shows the percentage of subjects that modified N2 between 40% and 60% of the time on both partitive and pseudopartitive items. Table 6.5 shows the same percentages for the partitive items alone. These tables give us a sense of what percentage of subjects might actually be guessing. The percentages are quite low.

Age	**between 40% and 60%**
3	0.00%
4	16.67%
5	25.00%
6	14.29%
Adult	4.88%

Table 6.4: Percentage of Adults that Modified N2 Between 40% and 60% on Partitive and Pseudopartitive Items Combined.

[61] Although subjects had three pictures to choose from, one picture did not contain the adjective at all. I assume that all subjects were able to distinguish that the adjective was relevant to their choice, so they were, in fact, choosing between two items, which would make chance 50%.

Age	between 40% and 60%
3	0.00%
4	8.33%
5	16.67%
6	14.29%
Adult	7.32%

Table 6.5: Percentage of Adults that Modified N2 Between 40% and 60% on Partitive Items Only.

The data in Tables 6.4 and 6.5 suggest that very few subjects (if any) are guessing blindly. It is most likely that the competing factors that I laid out in §6.2.4 (Table 6.1) are leading subjects in one direction or the other so that they are never guessing blindly. Regardless, the ambiguity still seems to be present.

Selkirk (1977) suggested that there were two structures each for the partitive and the pseudopartitive, due to the fact that the partitive sometimes behaved like the pseudopartitive and the pseudopartitive sometimes behaved like the partitive. This is based mostly on the following facts. The partitive items (a) and the pseudopartitive items (b) seem to allow treatment of either N1 or N2 as the head in the case of verbal number agreement (31), pronominalization (32) and S-Selection (33).

(31) **Number Agreement**

a. A bunch of those flowers was/were thrown out on the back lawn

b. A bunch of flowers was/were thrown out on the back lawn

(32) **Pronominalization**

a. A bunch of those flowers could be put in the vase, couldn't they/it?

b. A bunch of flowers could be put in the vase, couldn't they/it?

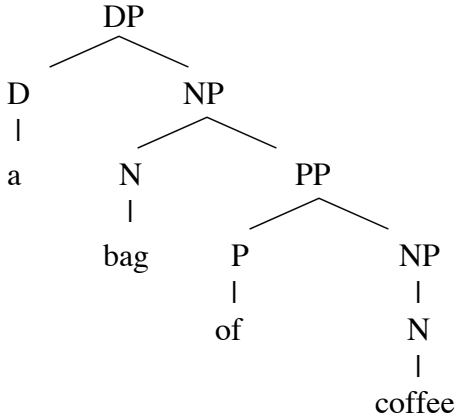
(33) **S-Selection**

a. She broke/drank a bottle of that good wine.

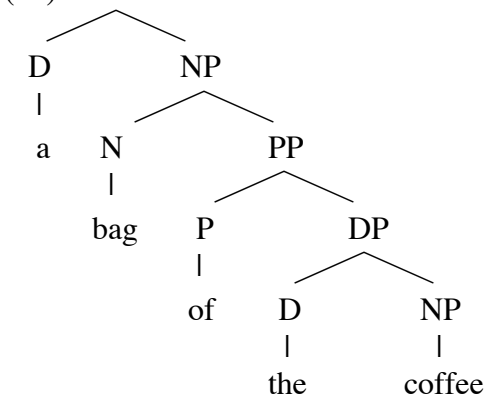
b. She broke/drank a bottle of wine.

Selkirk claims, as I do, that there are ultimately three structures. However, while Selkirk suggests that there are two N2-headed structures (one partitive and one pseudopartitive) and only one N1-headed structure (identical for both partitive and pseudopartitive), I think it may be the other way around. In this dissertation I have presented evidence for an N1-headed pseudopartitive (34) (§3.2.3.3 & §3.3) in addition to the N1-headed partitive (35) (Chapter 3).

(34) [N1-headed pseudopartitive]

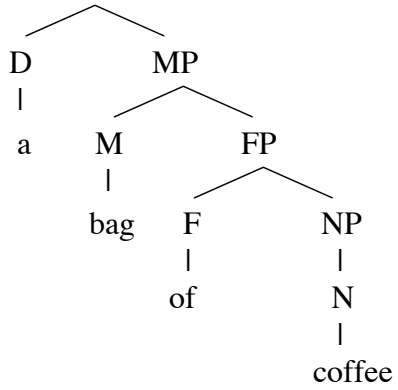


(35) [N1-headed partitive]



The difference between these two structures is whether N2 has a definite determiner. They are both head-complement structures containing a prepositional "of". The third structure is the (N2-headed) pseudopartitive (36) (Chapter 3).

(36) [N2-headed pseudopartitive]



An N2-headed partitive seems, by definition to be ruled out. Partitives are defined as structures that compute a measured amount of a discourse-relevant set. The discourse relevance must be encoded in N2's determiner. If the determiner is encoding discourse-relevant information then it will necessarily project a full DP –which prevents N2 from being able to head the construction. Thus, if N2 is the head of the construction, its determiner has

been reanalyzed in some way that allows all dominating material to be part of the single nominal projection –disallowing a true partitive structure. For this reason, I claim that only the structures in (34-36) are possible.

In this study I have shown that children and some adults allow N2 to be modified when they are presented with partitive structures. I claim that in these cases the partitive has either the structure in (35) or the structure in (36). In other words, the partitive that lacks a barrier feature either manifests as N1-headed but lacking some DP features/nodes (modified (35)) or it is N2-headed with all N1's material reanalyzed as functional material (modified (36)). The experimental data within does not distinguish between these accounts.

I promote the account in which the partitive maintains N1 as its head and projects a weakened intermediary DP. This account is supported by the data from Schafer & de Villiers 2000 and Carlson et al 2006, which show that a subset of adults seem to lack strong features on the definite article –which I claim translates into missing syntactic features in DP. I do not suggest that these adults *always* under represent DP, rather that they recognize that the definite article is ambiguous in its features and that these adults are more likely to under represent the features of the article in novel situations (or low frequency constructions). Using the pseudopartitive structure for the partitive is problematic because of the lack of node for the definite article. Regardless of which analysis we use to account for partitives that allow N2 to be modified by an adjective adjacent to N1, a reanalysis of DP is required.

It may be the case that DP has so many options in how it manifests crosslinguistically, and to a lesser degree in how it manifests in the English grammar, that some children reach adulthood without having solidified the full structure and semantics of DP in English. Or perhaps there is a dialectal split in the features that DP contains or a difference in pragmatic strategy in dealing with determiners.

Perhaps the reason children show such variability with the partitive is because they are sensitive to the variation in the adult language. Children encounter a structure with a clear prepositional complement (e.g. the "with" items), a pseudopartitive (which may itself have two structures) and a partitive, which, for some adults, is ambiguous in its structure. This variety and variability in the input may be enough to cause most children to show even greater variability in their comprehension (Lightfoot & Westergaard 2007). Some of these children solidify their structures well before adulthood and some make it to adulthood with continued ambiguity.

6.6 Conclusion

This is the first time the syntactic acquisition of the partitive structure has been addressed experimentally. It is also the first time that adjectival modification of the partitive and the pseudopartitive has been tested experimentally. And, finally, it is the first time that the acquisition of the partitive/pseudopartitive contrast has been investigated.

This study investigated adjectival modification and its interaction with the partitive and the pseudopartitive structure. The data revealed that children as old as age 6 do not differentiate between the partitive and the pseudopartitive in terms of adjectival modification. This suggests that, although children begin using partitives around age 2;6, they haven't fully mastered its syntax.

I suggest that the behavior of these children reflects an incomplete DP structure that is lacking the ability to block movement. I claim that there is variability in DP in English, that it only projects a barrier if pragmatic features such as referentiality are present. I assume that there is a direct link between the semantic and pragmatic features of DP and the syntactic features of DP. The English DP contains a broad range of features. I assume that a standard English partitive structure contains a standard (maximal) DP between N1 and N2. This DP has a complete set of syntactic nodes and projects a barrier to movement/modification. Thus, when adult English speakers hear the partitive, they know that it contains a barrier to movement.

The partitives presented in this dissertation are minimal pairs with pseudopartitives. They are not as frequently used in English as partitives like "three of the boys." They are also not as commonly used as pseudopartitives. It may be the case that these constructions are quite rare. Most adult English speakers, in novel linguistic situations, default to using a DP that contains the complete array of syntactic features (including the barrier feature). They only project a minimal DP structure for particular constructions (like light verb constructions, de Villiers & Roeper 1995) or usages (like generic "the" in "the lion is the king of the jungle"). There does

exist quite a bit of variability in what features DP contains and how much structure it projects, but the variability is predictable in the adult grammar –i.e. associated with particular constructions/usages.

I further claim that the variability in English DP slows the acquisition process for children to such an extent that some reach adulthood without being able to solidify their default strategy for the syntax of DP. These adults default to a minimal DP structure in novel linguistic situations unless they have clear evidence of strong semantic or pragmatic features. This strategy is reflected in the data of 15-20% of adult subjects who did not differentiate between the partitive and the pseudopartitive.

The naturalistic data shows us that the partitive structure is produced quite early on in the acquisition process –suggesting at least partial mastery of its syntax, but the acquisition of DP prevents children from mastering the partitive until much later in their development.

This dissertation encompasses a first look at the partitive structure. Many questions are left unanswered. The data herein supports the literature suggesting that children under represent DP structure and that they simplify the structure of complex nouns. I have argued that the reason children don't distinguish between partitive and pseudopartitive is because they project a minimal DP structure, however it is also possible that they are actually projecting a pseudopartitive when they hear the partitive. Future research will need to distinguish between these two accounts. The next step will be to investigate the adult grammar. Partitives that are minimal pairs with pseudopartitives have been untouched by the psycholinguistic literature.

It may be the case that adults have the option of processing these partitives as pseudopartitive –especially if English is in the midst of a process of language change in this area. Also needed is a study contrasting the processing of these partitives with the processing of more standard partitives like “three of the boys.”

The fact remains clear, however, that children have a significantly harder time distinguishing between partitive and pseudopartitive than do adults. Once data on the adult English grammar is clear, further investigation of children’s partitive grammar and how this ties into the acquisition of DP and of complex nouns in general is in order.

APPENDIX A

PILOT EXPERIMENT DATA

# of times each subject modified N1 and/or N2 during the course of the Pilot Experiment (ages 3-6):

		partitive				**pseudopartitive**			
subject	**age**	**container**	**substance**	**both**	**n/a**	**container**	**substance**	**both**	**n/a**
3	3	0	1	0	2	0	2	1	0
12	3	2	1	0	0	1	2	0	0
17	3	1	2	0	0	1	2	0	0
18	3	2	0	0	1	1	0	1	1
20	3	1	1	1	0	2	1	0	0
22	3	0	3	0	0	1	1	1	0
23	3	1	2	0	0	0	3	0	0
24	3	2	1	0	0	1	2	0	0
26	3	0	1	1	1	0	2	0	1
2	4	0	3	0	0	1	2	0	0
4	4	0	3	0	0	1	1	0	1
7	4	2	1	0	0	1	2	0	0
9	4	2	1	0	0	1	1	0	1
10	4	3	0	0	0	1	1	1	0
11	4	2	0	0	0	2	2	0	0
13	4	0	3	0	0	1	2	0	0
16	4	1	2	0	0	0	2	1	0
25	4	3	0	0	0	1	1	0	1
27	4	0	3	0	0	0	3	0	0
35	4	2	1	0	0	0	3	0	0
39	4	0	3	0	0	0	3	0	0
34	5	3	0	0	0	1	2	0	0
40	5	1	2	1	0	0	2	0	0
50	5	1	1	1	0	0	3	0	0
51	5	1	2	0	0	1	2	0	0
57	5	1	2	0	0	1	2	0	0
60	5	0	2	1	0	1	2	0	0
61	5	0	2	0	1	2	1	0	0
62	5	2	1	0	0	2	0	1	0
63	5	0	3	0	0	0	3	0	0
64	5	1	1	1	0	1	1	1	0
65	5	2	0	0	1	1	1	1	0
46	6	2	1	0	0	2	1	0	0
47	6	1	2	0	0	1	2	0	0
48	6	2	0	0	1	1	2	0	0
49	6	2	1	0	0	1	2	0	0
52	6	1	1	1	0	1	2	0	0
53	6	1	2	0	0	0	3	0	0
54	6	3	0	0	0	1	0	2	0
55	6	1	2	0	0	1	2	0	0
58	6	1	1	1	0	0	3	0	0
59	6	2	0	0	1	0	2	1	0

# of times each subject modified N1 and/or N2 during the course of the Pilot Experiment (adult controls):

		partitive				pseudopartitive			
subject	**age**	**container**	**substance**	**both**	**n/a**	**container**	**substance**	**both**	**n/a**
1	adult	3	0	0	0	1	2	0	0
8	adult	3	0	0	0	1	2	0	0
19	adult	2	1	0	0	3	0	0	0
28	adult	1	2	0	0	0	3	0	0
29	adult	2	1	0	0	2	1	0	0
30	adult	3	0	0	0	1	2	0	0
32	adult	2	1	0	0	2	1	0	0
33	adult	1	0	0	2	1	2	0	0
38	adult	2	0	1	0	3	0	0	0
41	adult	1	2	0	0	3	0	0	0
42	adult	1	2	0	0	0	3	0	0
44	adult	1	1	1	0	1	2	0	0
45	adult	3	0	0	0	3	0	0	0

APPENDIX B

ITEMS FROM THE "THE", "WITH" & DP EXPERIMENTS

(1)
Experimenter: This man likes strange animals. This animal is a Gax. It kind of looks like a rabbit, but it has no hair! Because the Gax doesn't have any hair, it thinks hairy things are really neat. And you know what it eats? Worms.

Puppet: It likes hairy things and WHAT does it eat?

Experimenter: The man takes care of the Gax and tries to make the best food for it to eat. But he doesn't know what the Gax likes, so he has been experimenting with different ways to feed the Gax. Look what he has here. He's made a plate that's covered in hair! He also has some plain plates. And he has some really hairy worms and some smooth worms. So he puts it all together [presents child with three pictures: (1) a normal plate with smooth worms; (2) a smooth plate with hairy worms; (3) a hairy plate with smooth worms]. Has a hairy plate with regular worms on it, a regular plate with hairy worms on it, and then one where everything is plain. The man doesn't know what the Gax will like so he puts all these things in front of the Gax and leaves the room. Well the Gax looks at all of these plates and you know what he says?

pseudopartitive:	I want a hairy plate of worms.
partitive "the":	I want a hairy plate of the worms.
partitive demon:	I want a hairy plate of those worms.
partitive poss. phr.:	I want a hairy plate of the man's worms.
partitive poss. pro.:	I want a hairy plate of his worms.
control:	I want a plate of hairy worms.

Puppet: Wait, I'm confused. Which one does he want? Which one is a _____?

(2)
Experimenter: This mom lives at the circus. She likes to bake cookies for all of the circus performers. All of the people at the circus love the mom's cookies --especially the seals… they'll eat *anything*! One day the mom, made lots and lots of cookies. She put them on plates. [picture of three plates, each piled with cookies].

Puppet: That looks yummy, do you like cookies?

Experimenter: As the mom was cleaning up after baking, three clowns and a seal came into the kitchen.

Puppet: I want to count how many. One, two, three clowns! And one seal!

Experimenter: The clowns started to dance and throw things! Uh-oh! Something's going to get broken! Lots of stuff broke, but the clowns were nice enough to try to pick things up. [child presented with three pictures: (1) an unbroken plate with unbroken cookies; (2) an unbroken plate with broken cookies; (3) a broken plate with unbroken cookies on top]. The mom was a little sad. She was worried that no one would want to eat anything now. Except remember, seals eat *everything* --they don't care what it looks like. And guess what? The seal wanted something! The seal whispered in the clown's ear,

pseudopartitive:	I want a broken plate of cookies
partitive "the":	I want a broken plate of the cookies.
partitive demon:	I want a broken plate of those cookies.
partitive poss. phr.:	I want a broken plate of the mom's cookies.
partitive poss. pro.:	I want a broken plate of her cookies.
control:	I want a plate of broken cookies.

Puppet: Wait a minute, did I hear the seal right? He wants a _____? Which one is that?

(3)
Experimenter: This is Jenny. She really likes to color with colored pencils. This is Jenny's dad. He really likes to color with colored pencils, too.

Puppet: Ooh! Ooh! … wait, what do they like to draw with?

Today Jenny and her dad decided to draw some pictures together. Jenny's dad bought Jenny two new boxes of colored pencils, see? And he also brought out some special colored pencils. See these are colored pencils that he used when he was a little boy. They're very old and used, --see, some are short or a little dirty or broken. Look the box is old, too, it's kinda ragged. But the dad really likes them, so every once in a while he brings them out to color with.

Puppet: Oh, so look. This box and these pencils are new. And this box and *these* pencils are new. And this box and these pencils are *old*. Is that right?

Experimenter: Well, Jenny and her dad colored and they made a big mess. Then they decided to play outside and they left the pencils and the boxes all over the floor! Well, Jenny's brother came in and saw the mess and decided to pick it up.

Puppet: Boy, he sure is a nice brother!

Jenny's brother wasn't sure what boxes to use, so he just put the pencils in whatever box he could. So look he put pencils in the two new boxes and the dad's old box. [child presented with three pictures: (1) a new box with new pencils in it; (2) a new box with old pencils in it; (3) dad's old box with new pencils in it.] After the brother finished he left *this* stuff on the

floor. A little later Jenny's mom came by and tripped over something and picked it up. She saw it was

pseudopartitive:	an old box of pencils
partitive "the":	an old box of the pencils
partitive demon:	an old box of those pencils
partitive poss. phr.:	--
partitive poss. pro.:	--
control:	a box of old pencils

Puppet: An old _____ ? Wait, which one did she pick up?

(4)
Experimenter: Here is picture of monkeys at the zoo. These monkeys are very silly. They like to play and they like to eat. Look they've got a swing set to climb on. And there's a big mud puddle near it. There's a lot of mud.

Puppet: Oh! I like to play and I like mud! Do you like mud?

Experimenter: Today the zookeeper brought peaches for the monkeys to eat. The monkeys decided to use the peaches to juggle!

Puppet: Juggling. That's when you throw balls in the air. How many monkeys are juggling?

Experimenter: Some of the peaches fell in the mud, but they kept juggling. They even kicked a bowl into the mud! The monkeys were so silly, they just didn't care what got muddy --and they made a mess! When they were done playing, they got ready to eat. First they put all the peaches back into the bowls. [three pictures: (1) a dirty bowl with dirty peaches in it; (2) a clean bowl with dirty peaches in it; (3) a dirty bowl with clean peaches in it]. Then they ate. They ate and they ate, but they didn't eat everything. When the zookeeper came back later he found something that they had left. He picked up

pseudopartitive:	a clean bowl of peaches
partitive "the":	a clean bowl of the peaches
partitive demon:	a clean bowl of those peaches
partitive poss. phr.:	a clean bowl of the monkey's peaches
partitive poss. pro.:	a clean bowl of their peaches
control:	a bowl of clean peaches

Puppet: Oh dear, I'm confused again. These are hard stories. A _____? Which one is that?

(5)
Experimenter: This is Kate. She's raking the leaves in her yard. She's cleaning up all the leaves so her yard will be neat and tidy. She's making a big pile of leaves and when she's done she's going to put them into some baskets.

Puppet: You know what I like to do with piles of leaves? I like to jump in them!

Experimenter: While she's raking she finds a mud puddle. She is careful not to step in the mud puddle and get dirty. Just as she was finishing the pile this little dog came along. His name is Rex. He *loves* leaves.

Puppet: Just like me!

Experimenter: Rex tries to jump in the leaves, but he falls in the mud puddle! The mud splashed everywhere! -- on the leaves and on the baskets! Kate said, "Rex! You made a mess! Will you help me put these leaves into baskets?" So Kate and muddy Rex put the leaves into the baskets. When they were done it looked like this [three pictures: (1) A clean basket with clean leaves; (2) a muddy basket with clean leaves; (3) a clean basket with muddy leaves]. And when it was all done, you know what Rex did? He jumped again! Rex jumped in a:

pseudopartitive:	a muddy basket of leaves
partitive "the":	a muddy basket of the leaves
partitive demon:	a muddy basket of those leaves
partitive poss. phr.:	a muddy basket of Kate's leaves
partitive poss. pro.:	a muddy basket of her leaves
control:	a basket of muddy leaves

Puppet: _____ … Can you show me which one that might be?

(6)
Experimenter: This is Mike. He's a knight. His job is to keep a castle safe. Look, he has spikes all over his armor. His armor is really spiky.

Puppet: Wow he is really spiky. Can you think of other things that are spiky? Are puppies spiky?

Experimenter: Mike's actually a really nice guy. His favorite things are bugs and spiky things. One day this little girl came up to the castle and asked if she could go in. She was carrying a basket that had three pots in it. It turned out that she was a beetle-seller (she raised the beetles herself) and wanted to go into the castle and see if anyone would buy what she was selling. Mike was really excited about what the girl was carrying, but he didn't have any money. Let's look at what she was carrying [three pictures: (1) a smooth pot with smooth beetles; (2) a spiky pot with smooth beetles; (3) a smooth pot with spiky beetles] Just then, a

townsperson came by and saw the little girl's stuff. He gave her 3 dollars and she gave him (/he got):

pseudopartitive:	a spiky pot of beetles
partitive "the":	a spiky pot of the beetles
partitive demon:	a spiky pot of those beetles
partitive poss. phr.:	a spiky pot of the girl's beetles.
partitive poss. pro.:	a spiky pot of her beetles.
control:	a pot of spiky beetles

Puppet: Oooh. Three dollars for a _____. Wait, which one is that?

(7)
Experimenter: This is Queen Gretchen, she really likes pretty gardens. Every year she has her gardener change her garden around to make it pretty in a different way. This year she decided that she wants lots of stones to decorate her garden.

Puppet: Stones in a garden? I've never heard of that before. Where do you think the stones go?

Experimenter: Queen Gretchen wanted stones in her garden, but she was really busy with queen work and couldn't go find the stones herself. So she sent three young men to go to the giant's kingdom and see if they could get stones. The three young men went to the giant king and asked. The giant king told them that he had a whole room full of stones and they could take what they wanted.

Puppet: Wow! A roomful of stones? Would that be a lot of stones?

Experimenter: The young men went to the room. Near the doorway they saw some cans. Cans would be good for carrying stones. The cans were funny shaped. One man took a square can, one man took a can shaped like a triangle and one man took a round can. [picture of cans]. Then they went to look at the stones. The room was *full*! The stones were piled higher than their heads and they were all sorts of colors and shapes! The man with the triangle-shaped can filled his can with the smoothest, roundest stones he could find. The man with the square can found a bunch of spiky rough stones. He thought they were really neat, so he filled his can. The man with the round can found star-shaped stones. [three pictures: (1) first man with triangular can filled with round stones; (2) second man with square pot filled with round jagged; (3) third man with round can filled with star shaped stones]. They then went back to the queen's castle and left what they had brought next to her throne. When the queen entered the throne room she was thinking that:

pseudopartitive:	a round can of stones would be perfect
partitive "the":	a round can of the stones would be perfect
partitive demon:	a round can of those stones would be perfect
partitive poss. phr.:	a round can of the Giant's stones would be perfect

partitive poss. pro.: --
control: a can of round stones would be perfect

Puppet: Oh I get it, she picked _____ and used it to decorate her garden! Wait, which one?

(8)
Experimenter: This is John, his mom makes him breakfast every morning. In their house they have lots of bowls of all different kinds. John's mom likes to collect bowls. Look, they have lumpy bowls and smooth bowls and square bowls! [picture]

Puppet: Which bowl do you like best?

Experimenter: One morning, John's mom made oatmeal for breakfast. Sometimes oatmeal is really lumpy. This oatmeal was weird. Parts of it were lumpy and parts of it were smooth. The mom put oatmeal into bowls for John and his sisters and every time she scooped some out it was different. Sometimes she scooped out smooth oatmeal and filled a bowl, sometimes she filled a bowl with lumpy oatmeal. She set out a whole bunch of different bowls and scooped the oatmeal in. [picture: square bowl with smooth oatmeal, lumpy bowl with smooth oatmeal and smooth bowl with lumpy oatmeal] Then she handed John:

pseudopartitive: a lumpy bowl of oatmeal
partitive "the": a lumpy bowl of the oatmeal
partitive demon: a lumpy bowl of that oatmeal
partitive poss. phr.: --
partitive poss. pro.: a lumpy bowl of her oatmeal
control: a bowl of lumpy oatmeal

Puppet: A _____? Which one do you think he got?

(9)
This is Willa the mouse. She lives in a hole in the wall in a store that sells bread and candy. The man who owns the store is really nice and he doesn't mind that Willa lives there, too. Willa loves candy and bread. This is why she lives in this store.

Puppet: Does she live in a store that sells candy and bread?

Experimenter: One night Willa snuck out of her mouse-hole and found a bag of peppermint candies. She jumped in and started to eat. She got *covered* in sticky sugar. After all that sugar, Willa decided she wanted to eat some bread. She went over to the counter and found three bags with bread in them. She went into each one and did some nibbling. When she was super full, she looked at the mess she had made --oh no! Gooey stuff everywhere from the candy and nibbled bread! [three pictures: (1) a non-gooey bag with non-gooey bread, but nibble-holes; (2) a gooey bag with non-gooey bread; (3) a non-gooey bag with gooey bread;

(gooeyness illustrated with peppermint candy color)]. Willa decided that she had to hide the mess. So she hid each one in a different place. Willa made so much noise that the baker came in to see what was going on. He saw gooey Willa and started to look around the room. He found:

pseudopartitive:	a gooey bag of bread
partitive "the":	a gooey bag of the bread
partitive demon:	a gooey bag of that bread
partitive poss. phr.:	a gooey bag of his bread
partitive poss. pro.:	a gooey bag of the store's bread
control:	a bag of gooey bread

Puppet: Oooh, a _____. Can you tell me which one he found?

(10)
Experimenter: This is Gina. She sells fish. She sets up her shop right by the river and then people come and buy fish from her.

Puppet: Mmmm! I like to eat fish. I keep it in my pocket sometimes.

Experimenter: Well Gina keeps the fish she sells in barrels. Some of the fish she has dried in the sun, see it's all flat and dry. Some of her fish she sells fresh --see, these fish are so fresh they're still alive and swimming around in the water in that barrel! [picture of three barrels. two have dried fish, one has fresh fish in water]. One day, Gina was selling her fish and a speed boat zipped close by on the river. It sent a huge wave that splashed Gina and the stuff she was selling. [three pictures: (1) a wet barrel with wet (dried) fish; (2) a wet barrel with dry fish; (3) a dry barrel with fresh wet fish; some explanation here pointing out the wet spots] Well Gina was looking at the mess and a customer walked up and asked to buy:

pseudopartitive:	a dry barrel of fish
partitive "the":	a dry barrel of the fish
partitive demon:	a dry barrel of that fish
partitive poss. phr.:	a dry barrel of Gina's fish
partitive poss. pro.:	a dry barrel of her fish
control:	a barrel of dry fish

Puppet: A _____? Which one will she give him?

APPENDIX C

DATA FROM THE "THE" EXPERIMENT

of times each subject modified N2 on controls (n=2), partitives (n=4) and pseudopartitives (n=4):

subject	age year	control	Partitive "the"	pseudopartitive
053A	3	1	2	1
096K	3	2	1	1
099J	3	1	1	0
103A	3	1	0	2
049G	4	2	1	2
050M	4	2	3	2
082D	4	1	0	0
083G	4	1	1	2
095C	4	2	4	4
111C	4	2	0	1
112R	4	2	0	0
042C	5	2	0	2
058T	5	1	3	1
063D	5	2	1	2
066C	5	0	0	0
068T	5	2	1	2
069E	5	2	0	1
091A	5	2	0	1
071C	6	2	3	2
029T	adult	2	0	1
030S	adult	2	0	1
032D	adult	2	0	2
033A	adult	2	0	0
034G	adult	2	1	2
061P	adult	1	1	0
077T	adult	2	0	2
079A	adult	2	1	0
087M	adult	2	2	0
089E	adult	2	0	0
092H	adult	2	0	0
118K	adult	2	3	3
119K	adult	2	0	2
121B	adult	2	0	2

APPENDIX D

DATA FROM THE "WITH" EXPERIMENT

# of times each subject modified N2 on controls (n=2), complex-noun "with" items (n=4) and pseudopartitives (n=4):

subject	age year	low_adj_n	prep_with_n	psp_n
048M	3	2	1	3
052J	3	0	2	4
057N	3	1	1	4
003A	4	2	1	4
007E	4	2	0	2
014S	4	0	2	4
037H	4	1	0	2
044O	4	2	0	2
015B	5	2	0	1
040M	5	2	2	1
062J	5	1	0	1
108S	5	2	0	4
031C	6	2	0	1
070R	6	0	1	3
074M	6	2	1	0
075O	6	2	1	2
009F	adult	2	0	1
010K	adult	2	0	0
012J	adult	2	0	1
018J	adult	2	1	2
021D	adult	2	0	2
022D	adult	2	0	0
025S	adult	2	0	2
028T	adult	2	0	1
085B	adult	2	0	2
086V	adult	2	0	0
093E	adult	2	0	0

APPENDIX E

DATA FROM THE DP EXPERIMENT

% of times each subject modified N2 on controls and on partitives with various determiner types: "the", demonstrative, possessive phrase and possessive pronoun (age 3-6):

subject	age year	control	"the"	demonstrative	Possessive phrase	Possessive pronoun
059A	3	100.00%	0.00%	50.00%	n/a	0.00%
011O	3	100.00%	25.00%	0.00%	0.00%	0.00%
047W	3	50.00%	25.00%	0.00%	0.00%	0.00%
026M	3	50.00%	25.00%	0.00%	50.00%	0.00%
024O	3	0.00%	75.00%	100.00%	n/a	0.00%
045M	4	50.00%	0.00%	0.00%	0.00%	0.00%
107M	4	100.00%	0.00%	0.00%	0.00%	0.00%
041I	4	100.00%	50.00%	0.00%	0.00%	0.00%
006L	4	100.00%	66.67%	0.00%	100.00%	0.00%
054C	4	50.00%	40.00%	n/a	0.00%	0.00%
004B	5	100.00%	0.00%	0.00%	0.00%	0.00%
043A	5	100.00%	33.33%	0.00%	n/a	50.00%
064V	5	100.00%	25.00%	50.00%	0.00%	0.00%
013K	5	0.00%	75.00%	0.00%	0.00%	100.00%
060J	5	100.00%	75.00%	100.00%	0.00%	0.00%
016S	6	100.00%	0.00%	0.00%	0.00%	0.00%
027B	6	0.00%	0.00%	0.00%	0.00%	0.00%
072E	6	50.00%	0.00%	0.00%	0.00%	0.00%
035R	6	0.00%	25.00%	0.00%	0.00%	0.00%
065A	6	100.00%	25.00%	100.00%	0.00%	0.00%
073G	6	100.00%	50.00%	100.00%	50.00%	0.00%

% of times each subject modified N2 on controls and on partitives with various determiner types: “the”, demonstrative, possessive phrase and possessive pronoun (adult):

subject	age year	control	“the”	demonstrative	Possessive phrase	Possessive pronoun
001J	adult	50.00%	0.00%	100.00%	0.00%	0.00%
002A	adult	100.00%	50.00%	0.00%	50.00%	0.00%
005P	adult	100.00%	0.00%	0.00%	0.00%	0.00%
008L	adult	100.00%	0.00%	0.00%	0.00%	0.00%
019A	adult	100.00%	25.00%	100.00%	0.00%	n/a
023D	adult	100.00%	0.00%	0.00%	0.00%	0.00%
076T	adult	100.00%	25.00%	0.00%	0.00%	0.00%
078A	adult	100.00%	0.00%	0.00%	0.00%	0.00%
080K	adult	100.00%	0.00%	100.00%	0.00%	0.00%
081S	adult	100.00%	0.00%	0.00%	0.00%	0.00%
094V	adult	100.00%	25.00%	0.00%	0.00%	0.00%
097A	adult	100.00%	33.33%	0.00%	0.00%	0.00%
098R	adult	100.00%	33.33%	50.00%	100.00%	0.00%
100R	adult	100.00%	50.00%	50.00%	0.00%	100.00%
101A	adult	100.00%	0.00%	50.00%	0.00%	0.00%
102A	adult	100.00%	50.00%	0.00%	50.00%	50.00%
104K	adult	100.00%	0.00%	0.00%	0.00%	0.00%
105T	adult	100.00%	0.00%	0.00%	0.00%	0.00%
106A	adult	100.00%	0.00%	0.00%	0.00%	50.00%
109R	adult	100.00%	0.00%	0.00%	50.00%	50.00%
110B	adult	100.00%	0.00%	0.00%	50.00%	0.00%
113C	adult	100.00%	0.00%	50.00%	0.00%	50.00%
114C	adult	100.00%	0.00%	0.00%	0.00%	50.00%
115H	adult	100.00%	0.00%	0.00%	50.00%	50.00%
116K	adult	100.00%	100.00%	100.00%	50.00%	50.00%
117S	adult	50.00%	0.00%	0.00%	0.00%	0.00%
120A	adult	100.00%	0.00%	100.00%	50.00%	50.00%

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